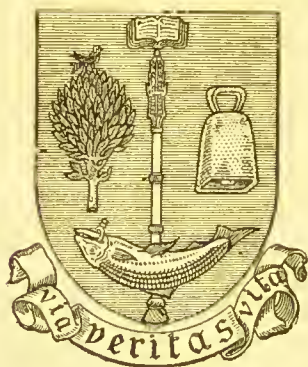


DRINK
AND
STRONG DRINK
A SERIES OF READINGS.

BY B.W. RICHARDSON.

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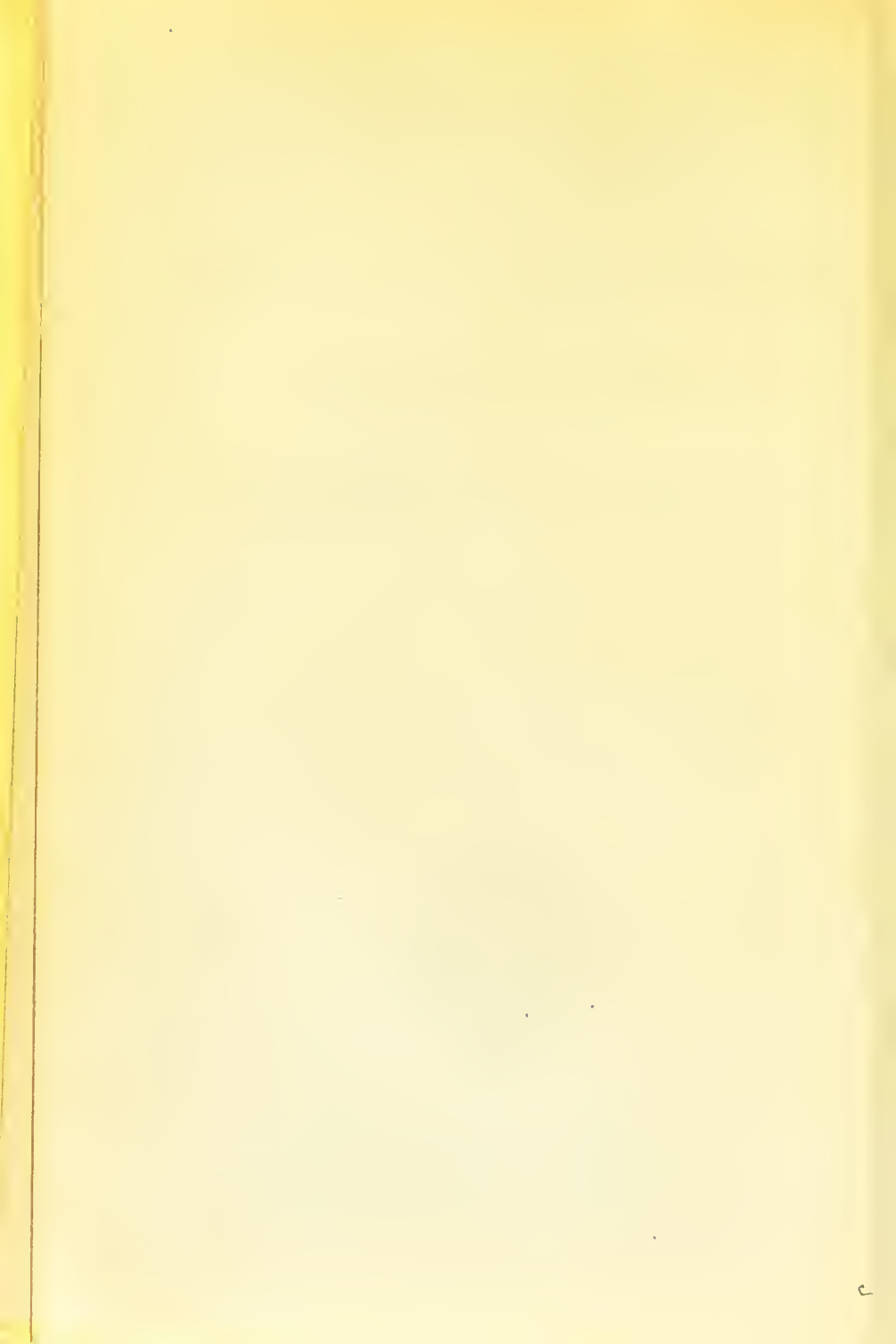
A Series of Readings
FOR
SCHOOLS AND FAMILIES.

BY
BENJAMIN WARD RICHARDSON,
M.D., LL.D., F.R.S.

HONORARY PHYSICIAN TO THE ROYAL LITERARY FUND.



LONDON AND GLASGOW:
WILLIAM COLLINS, SONS, & CO., LIMITED.



TO
JOHN GRUBB RICHARDSON, ESQ.

AND TO
MRS. RICHARDSON,

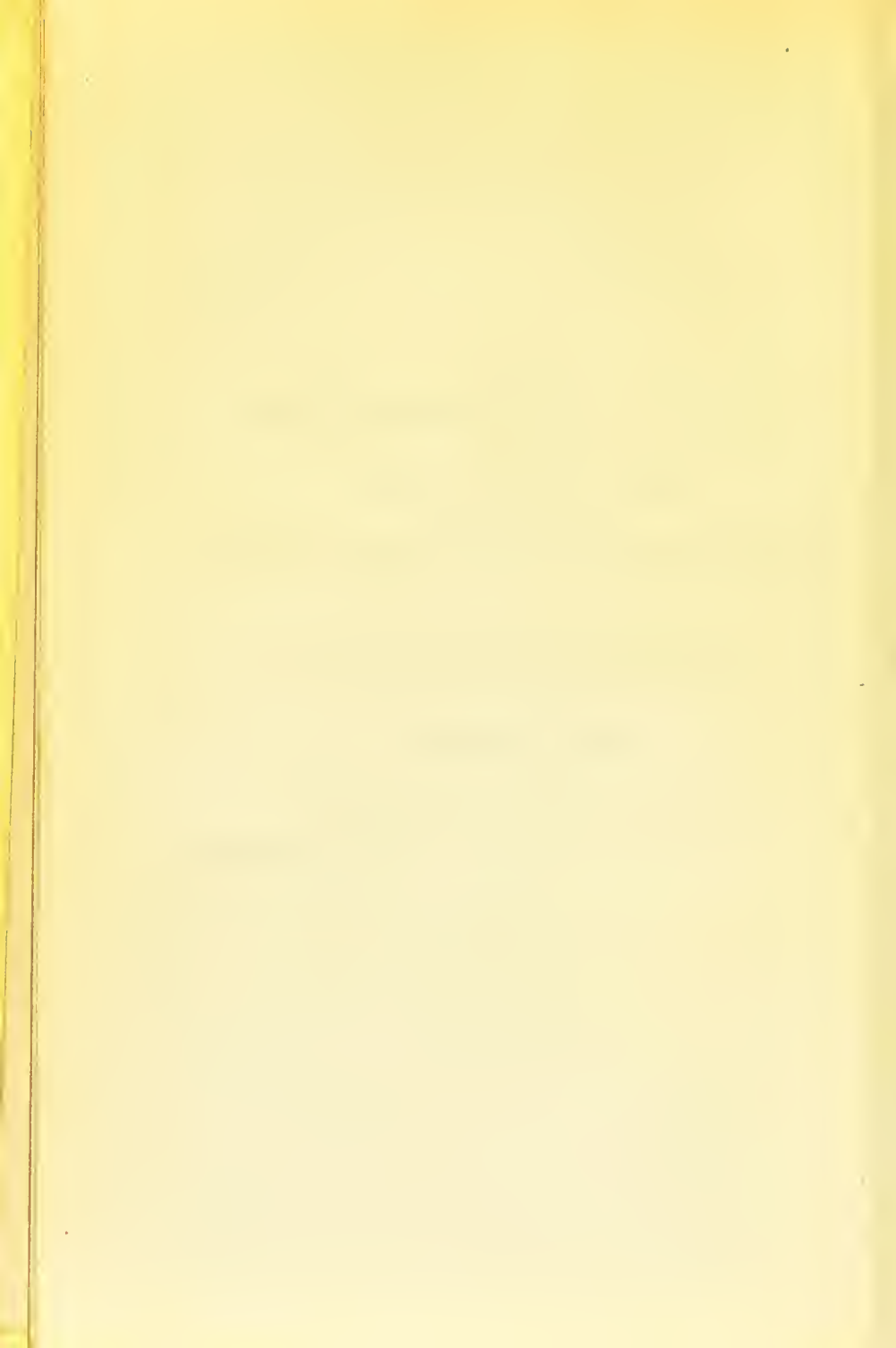
IN RECOGNITION OF THEIR GREAT AND EFFECTIVE EFFORTS
IN THE CAUSE OF TEMPERANCE,

AND
IN REMEMBRANCE OF THEIR KIND RECEPTION
AT BESSBROOK, IN 1877.

This Work

IS SINCERELY INSCRIBED BY THEIR FRIEND,

THE AUTHOR.

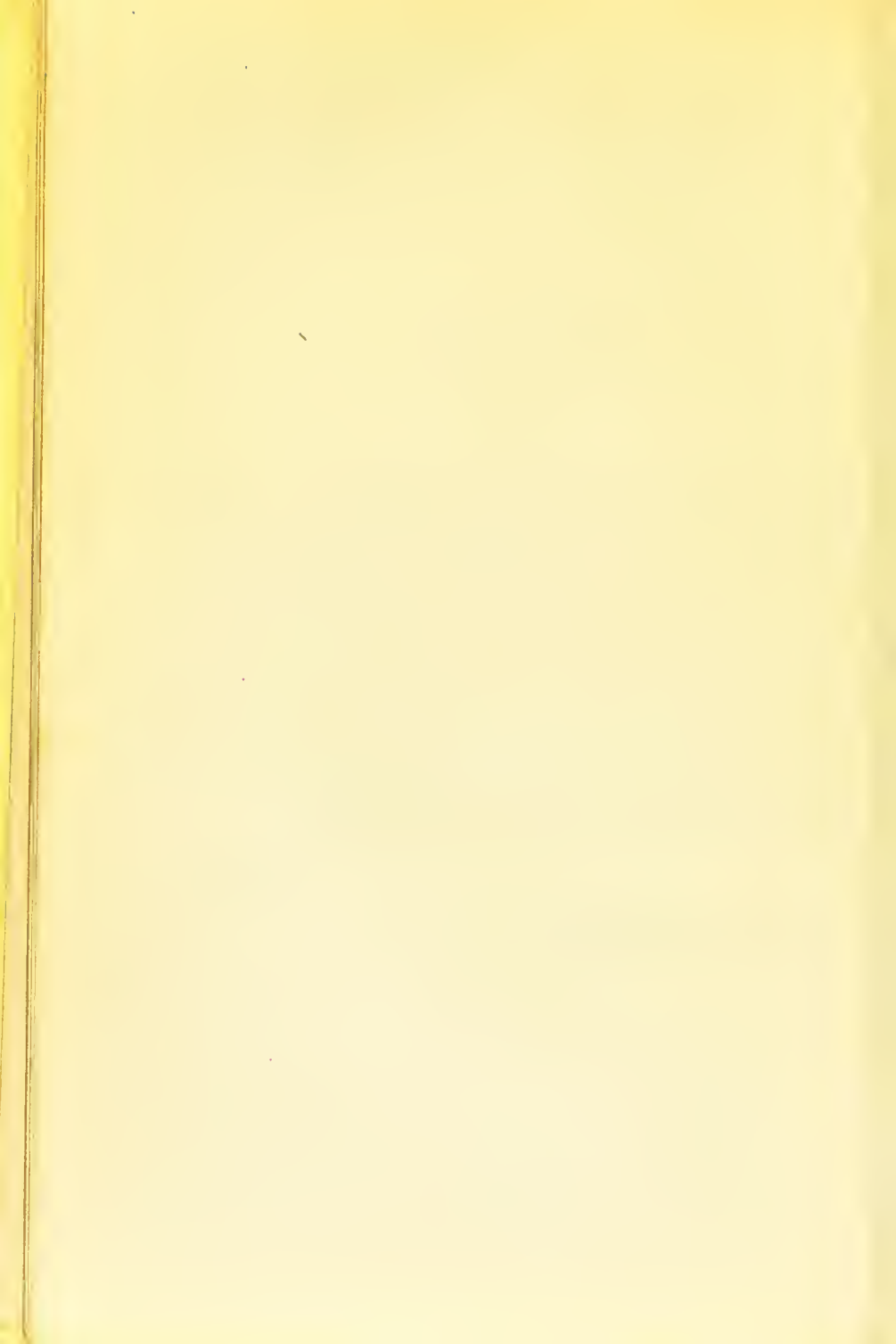


PREFACE.

THE book here presented to the public as a series of readings on *Drink and Strong Drink*, has been written on the suggestion of my good and much esteemed friend Sir WILLIAM COLLINS, for one of his class books. The object has been to write not for the youngest readers, but for the advanced young, and for all who are willing to see the total abstinence side of the alcohol question fairly and faithfully stated in plain and simple words.

B. W. R.

LONDON, *September*, 1882.



CONTENTS.

PART I.

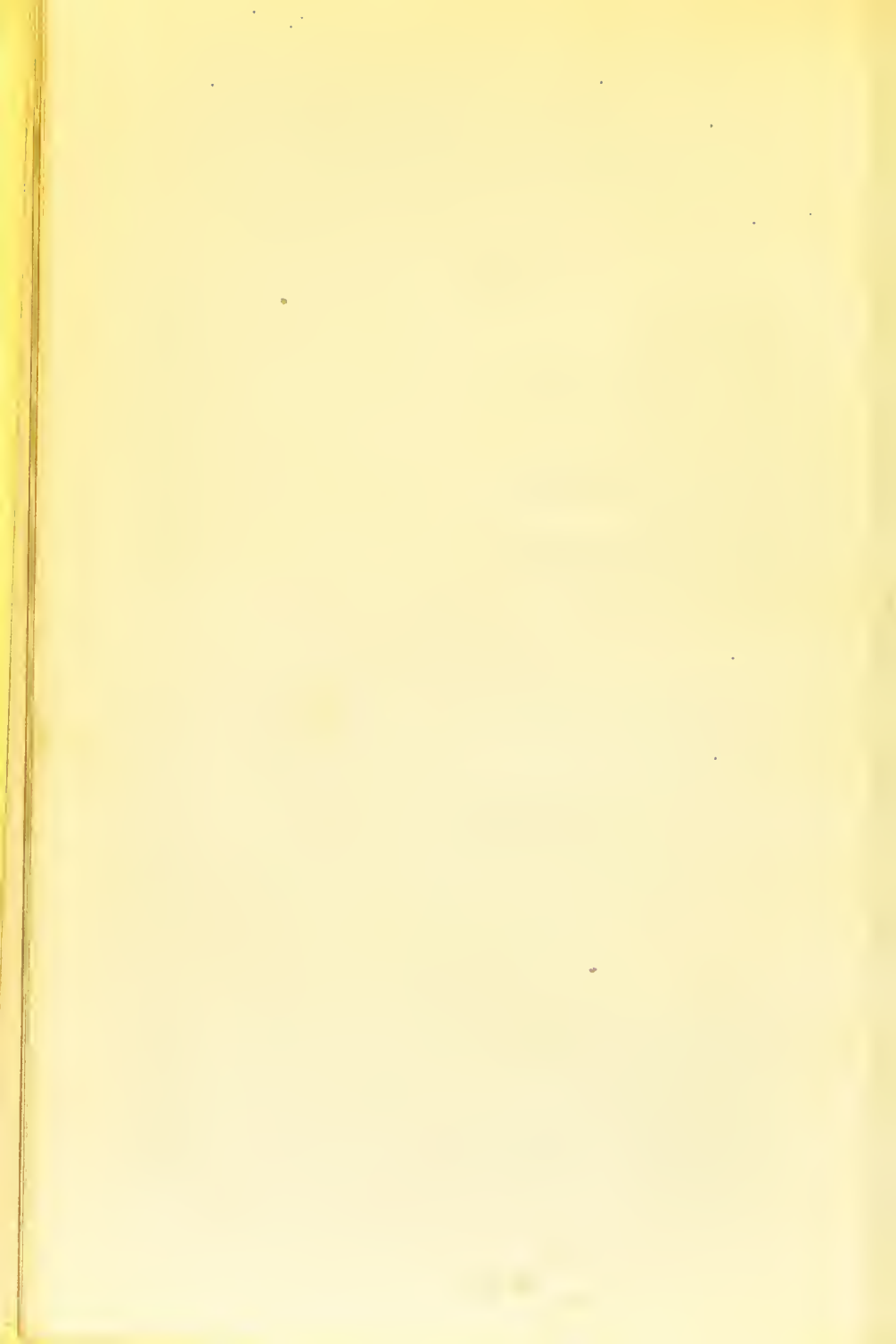
	PAGE
1. Good Digestion, - - - - -	7
2. Plants as Food, - - - - -	12
3. Plants as Water Carriers, - - - - -	17
4. A Typical Food, - - - - -	22
5. Wine, - - - - -	27
6. Strong Drinks Unnecessary, - - - - -	33
7. Ancient Wines, - - - - -	39
8. Wines of Ancients Nations, - - - - -	44
9. Habits of Drinking, - - - - -	49

PART II.

1. The Arabians and Alcohol, - - - - -	55
2. Wine and Water, - - - - -	62
3. Alcohol, - - - - -	71
4. Alcohol and Animal Warmth, - - - - -	80
5. Reception of Alcohol by the Body, - - - - -	86
6. Action of Alcohol, - - - - -	94

PART III.

1. Reasons for Abstinence, - - - - -	103
2. The Beginnings of the Evil, - - - - -	111
3. Alcoholic Populations, - - - - -	119
4. False Arguments Refuted, - - - - -	128
5. Happiness without Strong Drink. - - - - -	137
6. Conclusion, - - - - -	145



DRINK AND STRONG DRINK.

PART I.

I.—GOOD DIGESTION.

- Ab'sti-nent**, keeping away from indulgence in food and drinks.
- Ap-pa-ra'tus**, things provided as means to some end; tools.
- De-form'ed**, mis-shapen.
- Di-ges'tion**, the process of dissolving food in the stomach, and preparing it for nourishment.
- E-ma'ci-at-ed**, thin, lean.
- E-nerv'a-ted**, weakened, enfeebled.
- E-lab'or-ate**, improved and refined with much labour.
- Fa'ble**, a feigned story or imaginary tale.
- Fru'gal**, sparing, careful in money or food.
- Func'tions**, the office of any particular parts of animal bodies.
- Ge'nus**, an assemblage of species possessing certain distinguishing characters in common.
- Gla'ci-al**, icy, frozen.
- Ho'mo**, man; constituting the class and only genus and species of the order *Bimana*.
- I-de'al**, model for imitation as being perfect.
- In'stinct**, natural impulse.
- Mor'als**, the lessons taught by a fable or story.
- O-ver-feed'ing**, taking too much food.
- Pam'per-ing**, feeding luxuriantly or unduly.
- Rea'son**, the faculty of judging.
- Sparse'**, thinly scattered.
- Sys'tem**, a plan; a number of parts working for a common purpose.
- Veg-e-ta'tion**, growth of plants; plants in general.
- Vi'tal**, living, essential to life.

WE have to study in these Lessons what is good and bad for us to drink. William of Wykeham, who was one of the founders of the great school at Winchester, the capital town of Hampshire, is said to have written a proverb, which states that "Manners make the man;" and there is a great deal of truth in the proverb. It is, however, still more true to say that food and drink make the man, the woman, the child, so much depends upon what is taken in the form of food and drink. If too much food be taken, so that the body becomes very fat, the mind is made

dull, lessons are learned with difficulty, and when the body moves, either in work or in play, it is not quick and ready in movement, but slow and heavy. If food be taken in too small a proportion, the body becomes thin or emaciated, the limbs grow weak, and the mind is made feeble.

At the same time, it may always be remembered that the mind as well as the body is in better condition for work when the quantity of food and of drink taken is moderate, and when what is known as abstinent or frugal living is the habit most encouraged. The old monks who lived in the middle ages, who were often great scholars and industrious students, and who did many good as well as many bad things, knew well the effects of over-feeding on life and work. They said that no man could study on a hearty meal, and they knew that when the body became very fat, it became also very lazy.

I do not write these facts to make any boy or girl feel that it is a good plan to be negligent in respect to food and drink. It is very important that no one should make eating and drinking the chief object of life; but it is also most important that every one should acquire the habit of learning how to live well, how to take proper meals, and how to select foods for meals that shall tend to render life pleasant, happy, useful, healthy, and long. It is correct, therefore, to think of the stomach even for the stomach's sake, and to attend to its wants without pampering it or letting it become the master of all the other organs and parts of the body.

Æsop, who wrote the well-known fables, and who was one of the wisest of men, although he is said to have been a slave, and to have been of deformed shape, was anxious to impress on everybody the need of attending to the stomach and the other organs that are called into service in the

digestion of food. To make his intention clear, he invented a fable, entitled "The Belly and the Members." In this fable it is related that the hands, the legs, and the other portions of the frame of man rebelled against the stomach, which, they declared, did nothing but continue in rest and idleness all day long. Why should the hands work to prepare food for such an idle companion? Why should the legs go after food to fetch it and carry it? Why should the brain work to consider how to direct the hands and the feet, merely to serve so idle a companion? The end of it all was that these members rebelled against the stomach, and refused to do a single thing for it. But when it came to this pass, and the stomach got nothing to digest, then the rest of the organs quickly began to fail in their functions. The limbs became extremely weak, the brain became extremely feeble, and soon all parts failed altogether, because they wanted the central stomach to help them, and to keep them nourished as well as active. When, therefore, it was too late, the quarrelsome organs were led to see that what they thought was an idle companion was, after all, a most useful one. It did not make a great appearance of work; it did not work as it was bidden; but it laboured quietly and diligently all the same, and was the central power that was necessary for effecting the feeding of the whole animal body.

In all nature we seem to see this same truth, for the great works of nature, like the little works of Æsop, are so many fables, with this difference, that nature writes the grandest of fables, and presents through them the grandest of grand morals. In order to teach us her lessons on food and feeding, she gives us instinct to feel and reason to know or find out what is the value and what is the nature of that process, or rather of that set of processes, by which

foods and drinks are demanded, received, and applied by the human body. As we study her works, we find that the digestive apparatus in all animals is the primary or first and most vital part. It would not be quite correct to say that no form of animal being can exist without having a stomach and digestive system, but it is quite true to state that the most primitive act of the living condition and existence is digestion. Even plants may digest, and some plants, like animals, produce a true digestive fluid, seize and take into their stomachs small animals that fly near them, and digest the food thus obtained as animals digest their food. In the lowest forms of animal life, where the animal itself is so limited as to its powers of movement that it is held to one spot, there is a receptacle in the animal which takes in and digests food, and which is, in fact, a stomach. In the higher classes of animals, the digestive system becomes more elaborate in structure and in function.

Nature likewise gives us other useful morals from her fables respecting the foods that are taken into the digesting apparatus of her several forms of life, from the daintiest and most delicate to the rudest and most powerful. There is in every region of the earth food for the living forms that exist there, and the food comes before the life comes, when the natural course of events is followed out. Thus it is said by some great men that there is always on the earth a balance of food and of life; that where food is scanty life is sparse, and where food is abundant life is abundant. In the frozen Arctic regions, food being deficient, life is not abundant. Living things in those glacial regions are comparatively deficient in richness of colour and in rapidity of movement. In the temperate regions the abundance of food supplied

increases, and therewith the life is more abundant. In the sub-tropical regions, and those parts of the tropical, where the extreme heat is not destructive of vegetation, there are the greatest glories of animal life. Swift animals, powerful animals, beautiful animals; insects of varied hue; birds of varied hue; all things of life that can present pleasure to the eye, ideal of strength, ideal of speed, or, it may be, ideal of what is frightful or terrible, are there.

Lastly, nature out of her grand fables teaches this lesson, that as the food on which the animal lives precedes the life of the animal, so the source of all food is from the earth. The earth is the feeding mother: she yields us all food and all drink. She yields drink, the drink being the common fluid called water, to plant and animal alike, the same to each, and practically for the same purpose. She yields food as well as drink, but not in the same simple form. She yields the solid substances, which, in order to distinguish food from drink we designate specially as food, first to the plants. The plants prepare it for the after-use of animals, including the highest animal of all, the representative of the *genus homo*—man.

QUESTIONS.

- | | |
|---|--|
| 1. What is the subject of study in these Lessons?
2. What occurs if a person takes an excess of food?
3. Under what conditions of feeding, or taking of food and drink is work done best?
4. What philosopher wrote a fable, showing the importance of properly attending to the digestive organs of the body? | 5. What did the fable relate, and what moral do you draw from it?
6. What is meant by the balance of food and of life?
7. In what parts of the earth are food and life least, and most abundant?
8. Where does all food and drink for plants and animals come from?
9. What do plants and animals take alike from the earth?
10. What is done by plants for animals in respect to food? |
|---|--|

“So Heaven has formed us to the general taste
 Of all its gifts; so custom has improved
 This bent of nature, that few simple foods,
 Of all that earth or air or ocean yield,
 But by excess offend.”—*Armstrong*.

II.—PLANTS AS FOODS.

Ac-ci-den'tal-ly, by chance.
Ar-ti-fi'ci-al-ly, by art, not naturally.
Cal'ci-um, the metallic base of lime.
Com-bi-na'tions, unions of bodies in a mass.
Com-bus'ti-ble, capable of being burned.
Con-stit'u-ents, elemental or essential parts.
Con-trac'tion, tightening or lessening.
Cor'pus-cles, very small particles.
Cun'ning, skill, artifice.
De-vice, contrivance, invention.
El'e-ments, simple substances which cannot be further analysed or reduced to a simpler body.
Ex-per'i-ment, an act to discover some unknown principle or effect.
Gas'es, substances existing to the state of air.
Glob'ules, minute round bodies.

Grains, the smallest weights ordinarily used.
In-or-gan'ic, not formed with organs of life.
In-ter-me'di-ate, in the middle place between two extremes.
Lab'o-ra-to-ry, a place in which chemical experiments are performed.
Myr'i-ads, immense numbers.
O'pi-um, the juice of the poppy that produces sleep.
Or-gan'ic, possessing organs, and capable of living.
Phos'pho-rus, a combustible, semi-transparent element.
Re-lax-a'tion, act of slackening.
Trans-mu'ting, changing from one nature or substance into another.
Veg'e-ta-ble, plant destitute of sense and voluntary motion.
Vis'ce-ra, the bowels and other organs of the body, the contents of the abdomen, chest, and skull.

WE have learned that all that we require for food and for drink comes to us from the earth. We have learned that the earth provides one common fluid, as drink, for plants, animals, men. We have learned that the earth provides food direct for plants, and that plants prepare the solid foods for animals and men. Plants, therefore, in respect to food, hold an intermediate place between the earth and animals; for man, with all his cunning, has not yet learned how to use the elements and inorganic compounds of which the earth is composed for his food. Whether he will ever learn remains yet to be proved. To say he never will is to say more than would be correct, because the modern chemist can, in truth, produce from the inorganic world substances which are organic, and which at one time it was said could never be made arti-

ficially. These artificial substances are certainly not foods, but it may one day be quite easy to convert them into foods, when by experiment the way is made clear.

So long as the chemist is unable to carry out this device of transmuting earthy substances into foods, we must depend on plants for that duty, as all men and animals that have lived up to our time have depended. And, indeed, we may be very well satisfied that such a splendid natural chemistry is laid out for us in the vegetable world.

The vegetable world is indeed a wonderful chemical laboratory. All the earth supplies it with its materials, or, as we should say, its chemicals, and the air adds its parts also. The plants take up the elements that are required for the life of animals; they change the combinations of these elements, and make the elements combine into organic form or type; and so they prepare, in its crude state, food for man and beast. All this they do in the grand open laboratory of the universe, using the sun as their furnace, or their store of energy and life.

Does it not appear wonderful that the plants should do such giant tasks; that every little blade of grass should be busily at work; that the weed which we pluck out of our gardens should have its day of active labour for animals; that some plants should produce foods on which all animals can live, and other plants produce substances which, taken into certain animals, are deadly poisons? It is very strange indeed, but extremely wise. For be it understood that all the plants have their uses. The plants that are poisonous to one animal may be harmless to another. A man dies if he takes a few grains of a vegetable juice which comes from a poppy, and is known as opium; but a pigeon will take as much opium as would

kill fifteen to twenty men, and will not be injured at all, but will use the opium in its body as a kind of food. There are, in short, numbers of plants which would kill one animal, but which another animal can live upon.

Let us think out, next, what it is that the busy plant, in the grand laboratory of nature, gets from the earth for the uses of animals and men.

ELEMENTS OF THE BODY.

An animal body is made up of eleven working primary substances or elements, which are as follow :—

- | | |
|--------------|----------------|
| 1. Oxygen. | 6. Phosphorus. |
| 2. Hydrogen. | 7. Calcium. |
| 3. Carbon. | 8. Potassium. |
| 4. Nitrogen. | 9. Sodium. |
| 5. Sulphur. | 10. Chlorine. |
| 11. Iron. | |

There are a few more elements in the smallest quantities, but they, I think, are accidentally present; and as we could live without having them in our food, we need not trouble further about them.

These eleven elements are easily remembered, and we could not exist, in health, if even one of them were absent in its proper proportion. They are none of them inactive, and as a rule they are none of them in the free state in the body. I mean by this that they are combined together, two or more of them. It is true that in the blood we find two of the elements, namely oxygen and nitrogen, which are gases, present in the free state, but this fact does not concern us in regard to the study of these elements as foods. In the form of foods they are always combined.

The combinations, though very distinct in character, are not very numerous. Oxygen and hydrogen, the two first elements named, combine to produce the compound substance called water, the enormous importance of which in the body we shall learn in another reading. Others, hydrogen and carbon, together with oxygen, combine to make what we call the combustible or burning foods, the foods which, like the coal in the steam engine, act as the fuel out of which the animal warmth, the gentle animal fire, is kindled and kept going, in order to give motion and living power to the body.

Others, carbon, oxygen, and hydrogen, combine with nitrogen, phosphorus, and sulphur to produce those parts of the body which make up its solid or half solid structures; the skin; the muscles, or little engines of flesh which lie beneath the skin, and which by their contractions and relaxations make the limbs and other parts move; the lungs and the heart; the rest of the viscera or internal organs, with the brain and nerves; and, in the form of jelly or gelatine, thirty-three parts of the skeleton or bony framework.

The phosphorus and the calcium with some oxygen combine to form a salt of lime, called bone ash or phosphate of lime, which in the proportion of fifty-seven parts in the hundred, with ten per cent. of carbonate of lime and other salts, go to make up the solid portion of the bony skeleton. These combining with the gelatine give to the bones their strength and their solidity.

The chlorine, which is a gas, combines with the sodium, which is a metal, to make sodium chloride, common salt, a salt which is present in the blood and is necessary for its healthy condition. Some chlorine also combines with potassium to form another salt, called potassium chloride,

which also is found in the blood ; and again, some chlorine combines with hydrogen to form an acid, the hydrochloric, which acid exists in the digestive juice in the stomach, and is essential to the proper process of digestion.

Lastly, the element iron, probably in combination with oxygen, exists in the blood, and is essential to healthy life. The iron in the blood is in the minute globules called the red globules or corpuscles of the blood. The largest of these red globules is not more than the three-thousandth part of an inch in diameter ; but as there are myriads of them floating in the blood, and as they are in contact one with the other, in line, throughout all the channels of the blood, the iron runs along every vessel to the smallest, as if, indeed, it were a chain of the metal strung in the finest conceivable beads, and diminishing to the smallest conceivable line. What the precise uses of the iron are in the animal we do not know. They must be great, for when there is a deficiency of iron in the blood, the face becomes pale, the mind languid, and the limbs feeble.

I said that we derive all these constituents of the body through the plants, and that, as a general fact, we derive nothing from other sources. I should add now that to this rule there are two exceptions, one of which is most important, and the other somewhat important. We derive from the air, every time we breathe, oxygen gas, which goes to sustain the animal warmth, and without which we could not live ; so that the air, or, more correctly speaking, the oxygen of the air, becomes in one sense a food. We also take chloride of sodium, common salt, at our meals, and this, which is of use in the body, and is in that sense a food, we get direct either from the earth or from the sea.

QUESTIONS.

1. What position do plants hold in relation to the food and feeding of animals?
2. From what source do the plants derive their food?
3. What chemical elements are there in the bodies of men and animals?
4. What are the elements that by combination produce water?
5. What elements, by combination, produce fuel foods for the body?
6. What elements, by combination, produce flesh foods?
7. What elements produce the earthly material of bone?
8. Where is iron found in the body?
9. What element acting as a food do we take from the air?
10. What solid chemical substance do we take, for food, direct from the earth or sea?

Oh! mickle is the powerful grace that lies
 In herbs, plants, stones, and their true qualities.
 For nought so vile that on the earth doth live,
 But to the earth some special good doth give.
 Many for many virtues excellent,
 None but for some, and yet all different.

—*Shakespeare.*

III.—PLANTS AS WATER CARRIERS.

- | | |
|--|---|
| <p>A-nal'y-sis, separation of a compound body into its simple parts or elements.</p> <p>As-sim-i-la'tion, the conversion of nutriment into the substance of the body.</p> <p>E-re-ma-cau'sis, slow or gradual burning.</p> <p>E-vap-or-a'tion, passing off in vapour.</p> <p>Glu'tin-ous, tenacious, resembling glue.</p> | <p>In-vol'un-tar-y, not having will or choice.</p> <p>Min'er-al, natural productions found in the earth.</p> <p>Prim'it-ive, original, first.</p> <p>Poise', weight, balance.</p> <p>Pulses', all sorts of leguminous plants, like peas and beans.</p> <p>Sta'ple, a principal commodity.</p> <p>Veg-e-ta'ri-ans, those who use vegetables only as their food.</p> |
|--|---|

THE plants prepare the food for animals from water, or out of the substances which they take from the earth or from the air, and it is by this preparation of theirs that we and all our lower earth-mates are enabled to exist. The plants are water-carriers; they are fuel producers and fuel-carriers; they are flesh-producers and flesh-carriers; they are salt-carriers; they are carriers of iron.

The water which the plants bring to us is in such large quantity that if we could avail ourselves of all the water they bear in fresh vegetables and fresh ripe fruits, we

should really not need to drink any fluid whatever under our ordinary amount of work and play. Indeed, lately, I have known some persons, who, inclining to what is called a purely vegetable diet—vegetarians—have found it possible in the hottest weather to meet all the demands of thirst by the plentiful use of ripe fruit.

It will not be matter of much surprise that this should be the case when the proportions of water that are present in the various classes of vegetables and of fruits are known. Let me give a few examples, taken as specimens of those vegetable foods which are in most common request in everyday life. In one pound of potatoes there are twelve ounces of water; in a pound of onions there are nearly fifteen ounces; in the same weight of cabbage there are fourteen ounces; in sea-kale and in the turnip there are nearly fifteen ounces; in the tomato and in the carrot, fourteen ounces; in celery, nearly fifteen ounces; in lettuce, a little over fifteen ounces; in cucumber, a little over fifteen ounces; in water-cress, nearly fifteen; and in rhubarb, over fifteen ounces. As there are sixteen ounces in a pound, it will be seen that the greater part of these vegetables is simply water.

If instead of vegetables we go to fruits, and ascertain the quantity of water that is in them, we find the same kind of facts. Fresh grapes, plucked direct from the vine, yield nearly fourteen ounces of water to the pound; oranges, when the peel is removed, yield fourteen ounces; apples yield thirteen; pears yield nearly thirteen and a half; gooseberries yield over thirteen and a half; currants, red and black, yield thirteen; peaches yield thirteen and a half; apricots yield thirteen; bananas yield eleven and a half, and melons yield fourteen ounces to the pound. Even fresh nuts yield seven ounces and a half of water,

and walnuts, when they are fresh, seven ounces to the pound. You will see from these statements, which are the simple results of very simple forms of analysis, what wonderful water-carriers these vegetables and fruits are. In countries where they are abundant it really is not necessary to do more than drink from fruit.

If you should wish to prove the weight of water that exists in any fruit or any vegetable, you can prove it in a very easy way. Pluck the fruit while it is fresh and in a state of perfect ripeness; then weigh it carefully; next very gradually dry it down until by drying it ceases to lose any more weight. Finally, weigh the perfectly dried substance, and deduct the loss from the original weight of the substance. You can by a simple calculation of this kind estimate the loss. The loss is the water which has passed away in drying, and was present in the substance when the drying began. After this, if you wish to see the amount of water that has been lost by the evaporation, you can put as much water into a glass as represents the weight of water that was in the fruit, weighing it with a poise in the opposite scale that shall be equal to the weight of the glass which holds the water.

PLANTS AS FUEL, FLESH, SALT, AND IRON CARRIERS.

Plants are water-carriers for the body. But, as I have said, they are also fuel-makers and fuel-carriers. The fuels they produce for our animal wants, for our warmth and motion, are, as we now know, composed of substances, foods, containing the three elements, hydrogen, carbon, and oxygen. These fuels as they come to us from the vegetable world are in three principal forms; namely, starch, sugar, and fat or oil. Some plants produce sugar, some oil, but starch seems to be the primitive product

from which the others may be formed in the body. We cannot as yet, in our laboratories, make the substance starch out of its elements; neither can we transmute either starch or sugar into fat; but we can, in the laboratory, transmute starch into sugar, and I know a laboratory where many tons of sugar are manufactured, each year, from starch. In the human body starch can be converted into sugar and into fat, and starch therefore may be considered as the staple of our fuel foods. Starch comes to us in various ways: it is present in wheat and in other food; rice is almost pure starch; the potato contains from two to three ounces in every pound.

All these fuel foods, as they make their way through the body, undergo a slow combustion or burning, which the late Baron Liebig named *eremacausis*, slow or gradual burning.

The plants are also flesh-producers and builders of the body. They make for us from the earth those substances which we have seen to be composed of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulphur. The flesh and tissue formers come to us through the vegetable world in three chief forms of food, namely, as albumen, as fibrine or gluten, and as caseine or cheese. In wheaten flour we have albumen and the substance called fibrine or gluten, which gives the glutinous character to flour when mixed with water to form a paste; in oatmeal and barley we have gluten; in peas and beans and lentils, and what are known, generally, as pulses, we have caseine or cheese; and in almost all fruits and vegetables we have albumen and some fat or oil. The animal taking these products from the plants, turns them, by digestion and assimilation, acts which are entirely involuntary, into its own similarly constituted structures; into muscle,

which is composed of fibrine ; into brain and nerve, which contain a large quantity of albumen and fat, and so on.

The plants also collect for us, from the earth, the salts we require for making the firm structures, like the bones and the teeth. Wheat flour, ordinarily sold as the finest flour, but which is really not the best, contains fifty grains to the pound of mineral matter, out of which the bony structures of the body may be constructed ; and a pound of whole wheat meal, that is to say, wheat ground entire, contains as much as one hundred and fifty grains of such mineral bone-forming material. If you turn to other food grains, you find them also containing the mineral food for the animal body. In barley there are seventy-six grains of it in every pound ; in oats there are a hundred and fifty grains ; in maize there are a hundred and forty grains ; in peas two hundred ; in lentils the same quantity ; in potatoes seventy in every pound. In all fruits a small quantity is also present ; in grapes about thirty grains ; in peaches forty grains ; and in walnuts one hundred and twenty grains in a pound.

Lastly, plants take from the earth and give to the animal the iron that is necessary for the blood. Thus they give everything that is necessary.

QUESTIONS.

1. What is the chief constituent of fresh plants and fruits?

2. How much water is there in a pound's weight of the following fresh vegetables:—Potatoes, cabbage, turnips, tomato, sea-kale, rhubarb?

3. How much water is present in a pound's weight of the following fruits:—Apples, pears, oranges, grapes, plums, apricots, walnuts?

4. How would you ascertain the precise quantity of water that is present in any vegetable or fruit?

5. What substances in plants are fuel foods for animals?

6. What substances in plants are flesh-forming foods?

7. What substances in plants are bone-forming foods?

8. Which wheat flour contains most bone-forming substance, fine flour or whole meal?

9. What plants yield caseine or cheese?

“ They say that there is iron in the blood,
And I believe it.”—*Tennyson*.

IV.—A TYPICAL FOOD.

Al'i-ments, foods.**Car-niv'o-rous**, feeding on flesh.**Gait'**, manner of walking.**Gym-na'si-um**, place where athletic sports are taught.**Herb-iv'or-ous**, feeding on herbs.**Mam-ma'li-an**, relating to animals that suckle their young.**Pro'to-type**, a model after which anything is made.**Typ'ic-al**, emblematical.**Vie**, to contend or compare with.

THERE is always a very important experiment going on before us, by which we see how nature makes a typical animal food out of the earth. Wherever grass can grow on the earth, certain animals can live on the grass, and a man or other animal can live on their flesh. The plant, that is the grass, takes up the elementary materials from the ground, from the air, from the water, and makes from them the foods that we have learned the nature of in previous Lessons. We say that an animal that feeds on herbs or plants alone is a herbivorous animal, and that it holds the same intermediate place between animals that live on flesh and are called carnivorous, as plants hold to the earth and to it. The female of both classes, however, is capable of producing a fluid on which their young can live. A herbivorous animal, like the cow, produces this fluid from plants; a carnivorous, like the lioness, produces it from flesh. The fluid so produced or yielded is a typical food, **Milk**.

Milk is a food which represents exactly all the parts that are necessary for the sustenance of animals. This fluid is so perfect in all particulars that it is the food solely and exclusively yielded to the great mammalian classes of animals during the time when they are in their most helpless state, I mean when they are so very young that they are unable to do anything to help themselves. What, then, does this typical food contain? If we take a specimen from the cow, and analyse one

hundred ounces of it, we shall find that it is composed as follows. The hundred ounces contain:—

Eighty-six ounces and three-quarters of water.

Eight ounces of fuel-food, in the form of three ounces of butter, and five of milk sugar.

Four ounces and a-half of flesh-forming substance, as caseine or cheese, and albumen.

Three-quarters of an ounce of bone-forming or mineral substance.

So nicely proportioned are the foods which enter into milk that young animals require no other food, and I have known one instance of a lady who lived exclusively on cow's milk and water, and who grew up and enjoyed life as well as other persons, requiring no other food and no other drink. I do not say that it is wise or proper to live in this peculiar way. It is not altogether wise, and it is not necessary, since we have so many different sources of supply of food at hand. It is good, at the same time, to remember the facts about milk as a typical food; for he who knows what milk is made of, what is the value of each part of milk, what is the intention of each part, and what is the proportion of each part, sees a long way towards all that is practically understood respecting the composition and the value of food as a whole, and of drink as a whole, because milk is both food and drink.

A USEFUL LESSON.

I am now going to suggest an extremely curious question, and perhaps when you first read it you may think I am making fun of you. I assure you I am not doing so, but am intending to draw from the question a most useful lesson. We will suppose, then, that a child is living on milk. The child is quite well in health; it is exceedingly happy and playful; it can run as fast as any

other child, and for as long a distance; it can jump as high; it can laugh as merrily; it can sleep as readily and quietly, and wake up as much refreshed as any other child in the world. It can sing; it can learn its lessons easily; it can carry its little body erect, and move its limbs gracefully; it can exercise in the gymnasium, and it can vie with any of its fellows in looking the pink of health and beauty.

Suppose this child; then suppose that some one came and said:—"Yes, the child has good limbs, good muscles, and he gets these good parts, no doubt, from the milk he takes: the caseine or cheese of the milk builds up those parts well. But here I have got something to put into the milk that is like caseine very much, which the child will hate at first, but will soon learn to like to such an extent that he will not do without it if he can help it." And suppose that after this the muscles of this child became, in consequence, very unruly, so that he could not keep them still, nor make them obey his will and pleasure. Should you not think that the man had done a very foolish and mischievous act? I am sure you would think so.

Or, suppose the man, feeling the hand of the little child, said:—"This is a nice, healthy little hand; it is not too cool, it is not too warm; and such proper warmth and power that it has it gets from the butter and the sugar which is present in the milk on which it feeds. But, see you, I have something here like the butter and the sugar, which the child will hate at first, and will then so learn to love that he will take this new thing, whenever he can get it, in preference to the natural milk." And suppose the man's words proved true, and the child, learning to like the new thing exceedingly, took it, and was thrown by it into a fever, and afterwards became extremely cold

and chilly, and was also made unsettled in his mind, excitable and cross and silly. Should you not think that the man had done a very cruel and mischievous and wicked act? I am sure you would think so.

Or, again, suppose the man, feeling the bones of the child and moving the limbs, said:—"Oh yes, this child has a splendid skeleton, without any doubt, and he gets that skeleton in part from the caseine and albumen of the milk, and in part from the mineral matter that is in the milk. But I have something here like the bone-forming materials, which the child will hate at first, but will soon learn to like so much, that when he can get it, he will take it in preference to everything else of the kind." Suppose the child did take the new substance, began to like it, continued to take it, and in time got from it a deformed body, with crooked weak back and bent legs and feeble gait. Should you not think that the man who induced the child to take such a substance, even though in his ignorance he called it a food, had done a most mischievous, wicked, and cruel act? I am sure you would think so. I should think so at all events, and should do my best to stop the proceedings of that man, whoever he might be, and whatever people might say in his defence.

It is fortunate that no such man has ever risen to tamper in this way with the solid foods on which we feed. It is, however, unfortunate that when we come to the natural fluid, water, which forms so important a part of our bodies, the case is not so satisfactory. Once in the history of the world, when the human world was in its infancy, and when it was living on milk and on the first-fruits of the earth, some man or men came forward and said to those who were living very well on the water that nature gave to them in the fruits, the milk, and the springs and the

ivers:—"See you, we have learned how to make a new drink, which you will hate at first; a drink which will make you giddy and sick, and fevered; but which in time you will like, and will like so much, you will always take it when you can get it, in preference to simple water."

And the words proved true: for when men learned, as they did learn, to substitute the drink, which afterwards was called wine or strong drink, for water, they did indeed begin to like it best. Then, too, they commenced to learn what was the effect of taking this new fluid in place of the simple water which their bodies naturally required, and which forms a portion of all the other parts. For the muscles of those who indulged in this drink began to be unruly and false to the will, and easily powerless; their animal warmth became irregular, now high, now low; their temper began to get feverish, fretful, mad, and broken; and their skeleton became early decrepid and old, the back bent and the limbs feeble. Then, in short, a new and widespread disease crept in amongst mankind, which has never left it to this day. I do not ask now, "Suppose a man had done this, do you not think he would have done, however innocently, a mischievous, cruel, and evil act?" For man has actually done it, and I hope you will agree with me in thinking he ought to do it no longer, if we can stop him.

QUESTIONS.

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| <ol style="list-style-type: none"> 1. What is a herbivorous animal? 2. Why is milk called a typical food? 3. Name the parts of food that are present in milk. 4. State the quantity of each particular part of food in a hundred ounces of milk. 5. What are the corresponding food parts in plants? | <ol style="list-style-type: none"> 6. What is meant by a mammalian animal? 7. What are the proofs that milk is an all-sufficient food for mammalian animals? 8. What parts of animals do the parts of milk supply? 9. Is it wise to live on one particular kind of food? |
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"There is reason to believe that the best possible nonrishment for man is a mixture of animal and vegetable food in such proportions as to produce a composition resembling milk, which Dr. Prout justly regards as the model of what all our *aliments* should be made. He observes that nearly all our artificial combinations are nothing more nor less than disguised imitations of the prototype milk; and that the more nearly they approach this model, the more nearly do they approach perfection."—*Samuel Metcalf*.

V.—WINE.

Con-duct'or , a medium, a guide.	Im-i-ta'tion , copying in form or manner.
Con-fes'sed-ly , by confession or acknowledgment.	Or'i-gin , beginning, commencement.
Con'se-quence , that which follows any act.	Per-son-a'tion , imitating the person or character of another.
Con-structive-ly , by way of construction or interpretation.	Poi'son , that which destroys moral purity or health.
Cra'ving , urgent desire, longing.	Pop'py , a plant of the genus <i>papaver</i> , the juice of which causes sleep.
Del-e-te'ri-ous , injurious.	Pre-mi'sed , spoken or written of previously.
Des'ig-nat-ed , pointed out, named.	Prim'it-ive , relating to the beginning; original.
Dif-fused' , widely spread, flowing.	Re-ab-sorb'ed , imbibed or consumed again.
Dis-cov'er-y , the art of finding something hidden.	
E-merg'en-cy , an unexpected difficulty.	
Hi'ber-nate , to pass the winter asleep in close seclusion.	

WE have learned in the earlier readings something concerning the primitive forms of foods and drinks. We have seen how the plant prepares from the earth the nutriment which men and other animals require. We have seen that plants carry water to man as drink. We have seen that plants contain every food that is necessary for man. We have, moreover, glanced at a model food made in the bodies of animals, for animals, and called milk. We have learned that in milk there is everything that is necessary to maintain existence. We have asked, What would a man be doing who would so change the order of nature as to replace one of the natural gifts by another which at first was hated, and then, although it proved to be most dele-

terious, was calculated to create such a desire for itself and such a craving, that the man would prefer to take it, with all the consequences, rather than the natural liquid, water? We have thought, I hope every one of us, that a man who could and would do such an act would be guilty of doing a cruel and an injurious act, though he might not have intended it.

Then we found out that once in the history of the world, when man was not very wise, and could not foresee the consequence of his acts, he did introduce something that should actually be taken in the place of the water which is so freely given by nature, and which, though it might go against him at first to swallow, he did in the end swallow freely instead of water, to his own injury and to the injury of those who followed him and his example. We found, finally, that the fluid thus originally brought into use by man was called wine. How it got this name, or something like it from which the name is now taken, is one of the most singular of historical questions; and as it is always pleasant as well as useful to look at little bits of history, and to inquire into what the learned historian Beckman calls "the origin of inventions and discoveries," we will spend a minute or two on this word "wine."

It must be premised that wine was originally made, as it is still made, when the process of making it is honestly carried out, from the juice of the grape, and different countries have claimed the invention, as if it were a great honour to have been first in the field in the discovery. The old Egyptians had a god to whom they attributed great virtue and goodness. His tomb is still shown in what is called the "holy island," and it is said that on his tomb was written the phrase, "full of grace

and truth," to indicate in what respect and honour, we may almost say adoration, he was held. They called him Osiris, and they claimed for him the discovery or invention of wine.

The Greeks, who in the course of history followed the Egyptians, were not willing to let Osiris have so much credit. They declared the discovery of wine belonged to one of their great heroes, and that the name or word by which it was designated was sufficient proof of the statement. Their argument was in this way. They said the drink which they called Oinos was first discovered in Etolia, a part of Greece, and was connected with the name of one of their great heroes, Oneus. Or the discovery might have been made by Oneus himself, who first from the rich fresh grapes crushed or pressed out the liquid they contain and turned it into a drink. This was the origin of the name; "oinos" for the vine; afterwards oinos, or oinon, for wine. By the Romans the word became vinum, which word the French people shorten into vin, and which we by change of the letter v into the letter w, and by the addition of the letter e at the end, call wine. Oinos, oinon, vinum, vin, wine.

The Romans, later on, would have the world believe that their god Bacchus invented wine, and so fully have they impressed their belief on mankind, they have made us speak to this day of Bacchus as the god of wine and inventor of it. Our great English artist, George Cruikshank, once painted a wonderful picture known as the "Worship of Bacchus," in which Bacchus is represented as the god of wine, with all his mad followers worshipping him. You will find the picture in the National Gallery of London when you go there.

The Greeks probably have the best claim to any credit

that may be attached to the invention of wine. The Romans brought the art to what is called perfection, and introduced wines of great varieties and of various qualities.

WINE A LUXURY.

It is well worthy of observation here that the invention of wine occurred in one part of the world alone, and that it was first established, after it was discovered, in some centre of the ancient world from whence our own modern civilization sprung. The descendants of these inventors of the new drink, as they spread and increased on the surface of the earth, carried the art with them, and diffused the knowledge of it, while a good three-fourths of the people on the earth probably knew nothing about wine at all until it was brought to their knowledge from the centre which gave it birth. Wine, therefore, did not come to man as a necessity, it came as a luxury; and in that sense it still comes to all. For as every one is born a total abstainer from wine and every kind of strong drink, so every one fails to be a wine drinker until, by imitation or persuasion, he is tempted to make trial of it. Many pass through the first fourth of their lives before they even commence the trial of it, and when they do commence, it is confessedly for pleasure or for luxury.

The ancients themselves deserve to be credited with much honour in respect to their views on the subject of wine. They never pretended that it was required as a food for sustaining the health of the body. They never claimed that it was to be taken as a drink to quench thirst. They argued that it was to be taken at the feast in order to cheer and enliven the mind. They very soon found out that it would never do to drink wine in the same way as water is drunken. One of the greatest of

them, Solomon the Wise, said emphatically that "wine is a mocker." Another of them, the Greek philosopher Demosthenes, said, "To drink deep is a property fit for a sponge, not for a man;" and Seneca, the Roman philosopher, taught that to suppose "it possible for a man to take much wine and retain a right frame of mind is as bad as to argue that he may take poison and not die, or the juice of the poppy and not sleep."

Wine crept on to the tables of man as a *luxury*. It did not come to him as a *necessity*. He had everything that was necessary put before him without any reference to wine. He lived for ages, probably, without discovering wine, and millions of his kind have lived for ages since the discovery without knowing anything about it. There could be no better evidence that he was not created for it nor it for him on the score of his necessity.

There is one other proof of this same truth which it is good to keep in mind. The bodies of other animals of the classes nearest to man are all built on the same general plan. The animals go to the same original sources for food as man does. They require drink as he does. Their animal structures, bones, muscles, nerves, lungs, heart, viscera, are constructed out of the same materials, and are intended generally for the same services. An analysis, by the chemist, of the flesh of these other animals and of man, fails to show any important difference the one from the other, and, in fact, we can take the flesh of other animals, as food for ourselves, and turn it into our own flesh and blood. The bones of the lower animals, though they differ in shape in some details, are, constructively, the same as our own, and so it is with the other organs that make up the body. The lower animals also produce as we do, under favour-

able conditions for its development, the white firm substance which lies between the skin and the muscles and upon the internal parts, called fat, which fills up vacant spaces, keeps up warmth—for it is a bad conductor of heat—and serves as a reserve fuel food in emergency. Some animals, like the dormouse, hibernate or sleep for many months in cold weather. They eat and drink nothing, but live on their own fat, which is re-absorbed, and keeps up a gentle, animal fire. But none of these lower animals require wine to produce any parts of their animal bodies. Why then should man require it?

QUESTIONS.

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| 1. From what was the fluid called wine originally made?
2. What nations lay claim to its invention?
3. Why do the Greeks assert a special claim to the invention?
4. What is supposed to be the origin of the term wine?
5. For what reason did the ancients use wine? | 6. What evils did they recognise as produced by it?
7. Relate the sayings of some wise men on wine.
8. What proofs are there, derived from the history of man himself, that wine is not a necessity for man?
9. What further proofs are there of the same fact? |
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“When the wine’s in the wit’s out.”—*Old Proverb.*

“Who hath woe? who hath sorrow? who hath contentions? who hath babbling? who hath wounds without cause? who hath redness of eyes?”

“They that tarry long at the wine; they that go to seek mixed wine.” —*Solomon.*

“Wine bringeth forth three grapes—the first of pleasure, the second of drunkenness, the third of sorrow.”—*Anacharsis the Scythian.*

“If you were to see as a consequence of this beverage, a loathsome and mortal disease breaking out occasionally in all ranks, and sweeping away crowds in the most depressed portions of society, would you not lift up your voices against it?”—*Rev. Dr. Channing.*

VI.—STRONG DRINKS UNNECESSARY.

Ab-jured' , renounced, abandoned.	Log'ic-al , versed in the art of reasoning.
A-bol'ished , put an end to.	Mag'ni-fies , praises or extols, increases in size.
Ad-a-mant'ine , very hard, from adamant, supposed to be the hardest substance.	Main'ten-ance , sustenance, means of support.
Ar'gu-ment , discussion, debate.	Mass'ive , heavy, weighty.
As-suag'ing , softening, abating.	Mi-crosc'op-ist , one skilled in microscopy.
Av-o-ca'tions , pursuits or occupations.	Oc-ca'sion-al , incidental, casual.
Bil'lion , a million of millions.	Op-ti'cian , one who makes instruments to improve the sight.
Crev'i-ces , cracks, rents, or fissures.	Or'din-ar-i-ly , according to established rules.
De-pos'its , things thrown down or laid aside.	Pro-fess'ion-al , pertaining to a profession.
Ex-trem'i-ty , utmost point, highest degree.	Realms , kingdoms.
Frac'tion-al , a part or parts of a unit.	Re-la'tion-ships , state of being related or connected.
Glimpse , a slight flash, a short fleeting glance.	Re-quire'ment , necessity, what is wanted.
Har-poon' , a spear or javelin used for killing whales.	Sto'ic-al , not affected by passion.
In-fi-nite-ly , without limit, greatly.	Tis'sues , textures of parts.
Lens , a piece of glass bounded on both sides by polished spherical surfaces, or on one side by a spherical and on the other by a plane surface.	Un-aid'ed , not assisted.
	Vi'nous , having the qualities of or pertaining to wine.

THERE is so much said on the question of wine and of the other strong drinks, which are like it or are got from it, in their relationships to food, that we may with advantage think a little more carefully on the subject of such relationships. If the fermented drinks are foods, then they ought fairly to be considered as necessities of our life, and we are bound not to despise them. If they are not foods, we are bound to put them aside at all costs. There are some who go so far as to say, that if they are foods, in the strictest meaning of the term, they do so much harm from being used as foods, and there are so many other good and harmless foods to take their place, they ought to be abjured as foods altogether. Good though they may be, they ought to go. As wise men and women and phil-

dren, all classes alike ought to say, "let them cease to be made. They are such a mixture of good and evil, and the evil is so much greater than the good, let them go altogether." I am not quite sure whether I should myself employ, in such an extreme form, this stoical and logical line of argument. If my mind were made up that the wine drinks were necessary, I should, I think, be inclined to advocate their moderate use, and I certainly should advocate their occasional use. I object to war; but war may sometimes be necessary; and it would, it seems to me, be unwise to say that we should under no circumstances join with those who go to war. The art of cutting off limbs and of doing other painful operations on the body is not a pleasant art; but he would not be a wise man who would say, therefore, that such an art should be abolished. If, then, the practice of taking strong and injurious drinks, in place of water, were sometimes required, I would, to a certain extent, join in with it.

Fortunately, I am not driven to any such extremity. I have learned from the study of the question on all sides, that these vinous drinks are not necessary under any circumstances, except as drugs to be used by skilful and not only skilful but thoughtful physicians in the carrying out of their professional avocations. I do not find the necessity for these drinks anywhere. I do not see that life is benefited by the use of them, or that there is any demand for them, save and except when a small number of living creatures called men, are trained to wish for them without enquiring why they want them.

What, you will say, is it possible that the life of man is small in respect to numbers when it is said that the people on the earth may be counted by billions? Yes, it

is possible and it is true. In the universe of life, man forms but a mere fractional part. All the sea is full of life, life the most wonderful, from huge whales which it takes several men to waylay, harpoon, tow away dead and cut up, to small fish which a schoolboy can pull out of the water with his line or net, or infinitely smaller still. All the air is full of life. Winged birds of large size, like eagles and herons and vultures and pelicans, down to small birds like the tomtit, and down to insects which have wings like butterflies, and which fly with so much beauty, ease, and grace. On the surface of the earth man has companions almost innumerable; massive companions like the elephant and rhinoceros; graceful and swiftly running companions, like the antelope, the stag, the reindeer, the horse; companions in build very like to his own build, the ape, the monkey; companions of singular sagacity and faithfulness, like the dog. All these animals live to their full and natural term of life, if the circumstances in which they exist admit of it, taking no other drink than water.

If from this visible world of life we descend to the ordinarily invisible, to that world which can only be seen by the microscope, we find such myriads upon myriads of living things that the mind feels it very difficult to take their numbers into calculation. They are so minute, we must have a glass that magnifies to the fullest extent of the best opticians' art to see some of them; and could we see all that have been seen, we should still not see more than an infinitesimal part of that which exists in their wonderful, great little world.

St. Pierre, who wrote the charming story of *Paul and Virginia*, wrote also an equally beautiful story, founded on facts, relating to these worlds of minute

wonder. Nothing struck him so much as the marvellous beauty and activity of the tiny objects he observed. I am not surprised at his wonder. There is in the things of life unseen by the unaided eye such perfection, such evidence of power, in some cases such intelligence, as fills the mind with an astonishment and admiration it is difficult either to define or to express.

THE SUBJECT CONTINUED.

Remember all these realms of busy life. Realms upon realms of life in the sea, hidden by the great waste of waters; realms upon realms in the air; realms upon realms on the earth's surface; realms upon realms in all kinds of homes, out of common sight, in drops of water, crevices of stones, leaves of grass and trees, portions of foods, bodies of other animals; realms everywhere, in everything that the microscopist can turn his lens upon, and so reach and read. Then having, in some faint degree, got a glimpse of these realms, remember also the great truth that every representative of them that lives, from the highest and most elaborately formed to the lowest and most simply constructed, is, man alone excepted, provided with no other fluid for drink than the simple, natural fluid, water—the fluid that is sent direct from nature; the fluid that the grand Chemist supplies from His laboratory, as if it were half its work to produce it, and keep it in circuit and motion; the fluid that at one moment is assuaging our thirst, and at another moment is carrying our food, as a river carries merchandise, from one part in our house of life to another.

If every man, woman, and child living made wine or other similar fluid their usual drink; if they could not live without it; if all other animals were under the same

requirement, then there simply could not long be life, because there is no provision for life on such form of maintenance. Everything that every living being requires is made for it. The table of nature is spread, bountifully spread, for all its millions upon millions of guests; but wine and strong drink is not on that table. A clever man may make it, and put it on a side table for himself and a few of his friends, but he cannot make its use universal, and if he could he would destroy himself in the cleverness of his attempt to compete against natural law.

We may view this subject in another light. If we examine the bodies of animals that are dead, we can, by chemical research, discover of what structures their bodies are formed. We can discover that some animals of the lowest forms are made up almost altogether of water. We can find in other animals bones, muscles, nerves, membranes, blood, and other fluids. If we take to pieces, if I may so say, these different organs or parts, we can see in them minute bodies called cells, tissues holding the cells together, and fluids in the cells and tissues. We can examine these minute portions and discern to a considerable extent of what they are made. Once more, we can compare these parts of the animals with the food upon which the animals were fed, and can trace what we find from the food. We can get out of the parts water, fibrine, albumen, caseine, iron, fat—all that belongs to true food; but in the natural state we can trace out no such thing as wine, or that spirit of wine which distinguishes wine from water. If in an animal we were to find the spirit of wine present we should know that it had no natural place there, and we should, as a rule, discover in the body that contained it signs of diseases produced by it.

QUESTIONS.

1. What reasonable argument would favour the idea that vinous drinks are good for man?
2. Admitting such drinks to be foods, why would some still object to their use?
3. Is such objection sound? and if not, why not?
4. What proof is there derived from the world of life, that wine or strong drink is not necessary for life?
5. What would happen if man could make wines and strong drinks universal drinks?
6. What does the examination of the bodies of animals reveal in respect to their construction?
7. If spirit of wine were to be found in the body of an animal, what should we infer, and what should we be likely to discover?

“ Miriam was dead. In Kadesh Miriam died,
 And in the desert she to rest was laid;
 And they who laid her there in anger cried
 To him who led them. ‘Give us drink!’ they said;
 ‘We die of thirst. Here! here! we cannot bide.
 Why have you led us here to find no shade
 Of vine or fig tree, whither we can hide
 From rays that kill and scorch up every blade?’

“ Then he who led them struck a barren rock,
 Struck with his rod the adamantine grain;
 And from the blow—as from the lightning shock
 That cleaves the sturdy oak upon the plain—
 The rock was riven: and, as if to mock
 Their fiery rage, there issued forth a train
 Of limpid silver. Drink, and let each flock
 Of cattle drink, and thirst no more again.

“ Not wine of grape, nor barley, this which flowed
 In silver stream from out that barren cave;
 Not drink that Egypt made and man bestowed;
 Not drink which cowards sought to make them brave;
 Not drink which turned mere troubles into woes,
 But water, coming from the hand that gave
 All needs and gifts. The drink each creature knows,
 Takes for its wants, nor learns for more to crave.”

VII.—ANCIENT WINES.

Ac-quaint'ed , well-known, familiar.	Fer-ment-a'tion , motion occasioned by a certain degree of heat and moisture, and attended with escape of an air or gas.
Ad-min'is-ter , to give, to supply, to aid.	Hu-mane' , having the feeling proper to man.
Ar-chi-pel'a-go , a sea with many islands; or, a group of islands.	Il-lus-tra'tion , explanation, example.
Au-ster'e , severe, rigid, sour.	Im-port'ed , brought from another country.
Be-nefi-cent , performing kind acts.	In-tox'i-ca-ting , having qualities that produce drunkenness.
Be-nign' , kind, gentle, salutary.	Ma-ture' , perfect, ripe, ready.
Com-mo'tion , agitation, excitement.	Me-dic'in-al , having the property of healing.
Con'sci-ous-ness , knowledge of what is passing in the mind.	Nar-cot'ic , producing sleep.
Di-a-pho-ret'ic , having the power to increase perspiration.	Sub-ject'ed , under the power of.
Drug , general name of substances used in medicine.	Trance , an ecstasy, a dream.
Ex-pressed' , pressed or squeezed out of.	Un-fer-ment'ed , not having undergone the process of fermentation.

WE have several times come upon the term "spirit of wine," and it is, I think, time that we became acquainted with this term, so as to understand what it means. To begin then at the first, it should be understood that the substance or fluid first called wine was considered to be a drink entirely distinct from water. The first discoverers of wine squeezed the rich juice from the grapes, collected the fluid, and let it stand in the open air. By-and-bye, usually in the course of a few hours, they observed a great change came over it. It underwent a commotion, and seemed as if it had been subjected to the action of heat. They said it fermented. When it was drawn off it was found to be a fluid, very clear and almost as varied in colour as the fruit from which it was expressed. Sometimes it was white, sometimes red, sometimes dark. Different grapes yielded different fluids or wines.

In course of time names were given to these different fluids, and the Romans had an immense number of such wines, a few of which they laid by for many, some say

for two hundred, years, in order that they might become mature or ripe. When the wine was newly made, before it had time actually to ferment, it was named *mustum*, and was what we should call now unfermented wine—the expressed juice. The juice which ran from the grape without pressing was called *protropum*. It was thinner and clearer than mustum. Sometimes honey was mixed with mustum, and the liquid so formed was called *mulsum*. Again, the mustum was boiled down to half its quantity, and then it was called *defrutum*; or it was boiled down to a third, when it was called *sapa*.

These unfermented wines were no doubt largely used by the Roman people, and there was nothing whatever to be said against their use. They were quite harmless until, under a more luxurious rule and custom, it became an art to ferment them and turn them into wines of different character, which had intoxicating properties.

The Romans carried this out at last to such an extent that the wealthier of them seem to have had wines of all kinds. I have reckoned up a list of over forty in number, all differing to a certain extent. Pliny, the Roman writer, says there were one hundred and seventy-five. One class of these wines was home-made; a second class was of foreign make; a third class took its name from the colour of the fluid; a fourth, from the qualities of age; a fifth, called usually after the place it came from, was salted; a sixth class was medicinal; a seventh was newly-made; an eighth was sweet; and a ninth was called by the singular name of death wine.

To give an illustration of one or more of these kinds of wine, I may mention the following:—

Falernian was the most esteemed of the home-made Roman wines. It was often kept for ten years before it

was used, and it was probably something like the wine which in these days we call Madeira.

Chian and Lesbian wines were favourite specimens of the second class or foreign wines. These were sharp or austere wines.

The wines of the third group were named after their colours. *Album*, or white wine; *nigrum*, dark; *rubrum*, red; and many more.

Those of the fourth class, which were called after their age or other qualities, received such names as *vetus*, old; *novum*, new; *hormum*, wine of the present year; *trimum*, wine of three years; *molle*, wine that was soft or mellow; *asperum*, wine that was rough to the taste; *merum*, wine that was pure; *fortius*, wine that was strong.

Those of the fifth class, the salted wines, were the *Myndian*, *Halicarnassian*, *Rhodium*, and *Coum*, so named from the places whence they were imported.

The wines of the sixth group, called sometimes medicinal wines, were named *Cnidium* and *Adrium*. The first, it was believed, made the blood rich and healthy; the second was said to be a wine that made the body of him who took it perspire freely; it was, therefore, also called a diaphoretic. There were other wines of this class, but the specimens named are sufficient as examples.

The wines of the seventh class were those newly made, namely, the mustum, the protropum, the mulsum, the sapa, and the defrutum, already described.

The wines of the eighth class were those of a sweet character. One of these was called *passum*, and was made from grapes that had been dried in the sun. Another of these sweet wines is believed to have been the same as the wine called afterwards Malmsey,—the wine, you will remember, in which the unhappy Duke of Clarence, the

brother of King Edward the Fourth of England, is said to have been drowned.

NARCOTIC WINES.

The wine or wines of the last class must be named with care, because of their singular history. The Greeks had a wine they called *morion*, and the Romans had a similar wine, which they called *murrhina*. In both cases this means death wine, and it was entitled to this name because it produced, after it was taken, a deep sleep or trance, which resembled death so closely that it was hard to tell whether the persons who had swallowed it were dead or living. This sleep or trance would last for several hours. The death wine was made by adding to fermented grape juice, myrrh and the root of an herb called mandrake or mandrāgora, which grew in the Grecian archipelago. The plant is of the same family as the deadly nightshade of our lanes and hedgeways which yields the drug called *belladonna*, in which there is an active narcotic, known as *atropine*. This murrhina or death wine was used by the ancients for a most humane purpose. It was given by their physicians to persons who were about to be subjected to painful surgical operations. Under its benign influence the persons were made to lose all consciousness, and while they were in this senseless state the operation was performed. After a few hours they awoke from their deep slumber, and did not know that they had ever been under the hand of the operator at all.

In these days we do the same beneficent act when we put people to sleep with chloroform, or ether, or methylene, or laughing gas; and we sometimes think how wise and clever we are for having made the discovery of so great a blessing. But, as you see, we did not discover

this process at all. It was known many ages ago, a fact which brings to our minds the saying of the wisest of men:—"There is nothing new under the sun."

The death wine was also used for another equally beneficent purpose and for a more solemn and awful ceremony. When criminals were about to be executed the death-wine was given to them in order to stupefy them, that they might die without suffering. During the time of the great Sanhedrim, when Judea was occupied as a conquered country by the all-conquering Romans, the gentle-hearted Jewish women used to go forth and administer the death wine, wine mixed with bitter herbs and frankincense, to those about to suffer, in order to assuage or prevent the agony. Some believe that this humane custom was in existence before this period of time, and, in evidence, quote the words of Solomon:—"Give strong drink to him that is about to perish;" and also the words of Jeremiah, when he bids those who are to be slain to drink first of the cup and be drunken, and fall and rise no more, "because of the sword that is to follow." Morewood, a most able writer on intoxicating drinks, suggests that the old English custom which once prevailed of giving malefactors, as they went to the gallows, a large draught of strong ale as the last drink, was for the same purpose, namely, to deaden the senses and take away the horror of death.

I wish you to remember these details about early or ancient wine, that you may have a clear knowledge how wine was first introduced, and for what reasons it was introduced. It will be seen that when it was first used it was an innocent thing enough, was as harmless as a fruit, and was, indeed, the expressed juice of a most delicious fruit. It was only by an after process that it

was changed into a drink that was to become maddening and mischievous to mankind.

QUESTIONS.

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| 1. What was the first idea about wine as a fluid?
2. What was the first mode of obtaining wine?
3. What was the process called that yielded intoxicating wine?
4. What names did the ancient Romans give to their unfermented wines?
5. How many classes of wines did the Romans invent? | 6. What was the use which the Romans made of the wines called Cnidium and Adrium?
7. Which were the least hurtful of the Roman wines?
8. What was the wine last named in the classes of Roman wines?
9. To what humane purposes was this last named wine applied? |
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“ Take thou this phial, being then in bed,
 And this distilled liquor drink thou off;
 When presently through all thy veins shall run
 A cold and drowsy humour, which shall seize
 Each vital spirit; for no pulse shall keep
 His natural progress, but surcease to beat.
 No warmth, no breath, shall testify thou liv’st;
 The roses on thy lips and cheeks shall fade
 To paly ashes; thy eyes’ windows fall,
 Like death when he shuts up the day of life.
 And in this borrowed likeness of shrunk death
 Thou shalt continue two and forty hours,
 And then awake as from a pleasant sleep.”

—*Shakespeare.*

VIII.—WINES OF ANCIENT NATIONS.

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| Ce’res , the goddess of eorn.
Con-cen’tra-ted , brought to a condensed or close form.
Dis-cre’tion , power of ordering wisely one’s conduct.
For’ti-fy , to strengthen, make stronger.
Lines , limits, extent.
Mis-ap-pre-hen’sion , misunderstanding of meaning. | Mis-laid’ , put in a wrong place. lost.
Pro-hi-bi’tion , act of forbidding.
Pur’blind , seeing obscurely.
Sage , wise, sagacious.
Sal-ine’ , consisting or partaking of the qualities of salt.
Tan’nin , a name applied to a vegetable acid, derived from gall nuts. |
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WE gathered in our last reading that the ancients made their wines from the juice of the grape, and that they had many kinds of wine. They became, in course of time, well acquainted with other modes of making a drink which resembled wine in its properties. It was discovered

that dates, if they were plucked when they were just ripe, thrown into water and boiled for a day or two, would, on being poured into earthen jars and placed in the earth, give to the liquid something that would undergo fermentation and turn into a wine which received the name of palm wine. The Egyptians also found that the corn we now call barley, if it were mashed, could be made to go through a process of fermentation and produce a liquor, Egyptian or barley wine, for which they became very famous. This invention was also attributed to the great deity of Egypt, Osiris, and afterwards to Ceres, the goddess of the corn-fields. The fluid was called by the first makers *zythum*, and later *ceris vinum*, wine of Ceres, meaning corn wine. To this day we use a term derived from the same word: we speak of corn of various kinds, wheat, barley, oats, maize, as "cereal produce," and we still speak of the heathen goddess Ceres as the goddess of the corn-fields. The Romans, on days devoted or dedicated to Ceres, adorned her altars with sheaves of corn.

The Hebrew word for corn is *bar*, and so we get the word barley; and from barley in Saxon times came the word *bere*, and from that in our times the word beer. The wine that the Egyptians made from barley was in fact the drink we now call beer. I should think, however, it was an infusion of barley, not a fermented drink, but a kind of wort like the sweet wort which we still produce in the manufacture of beer, before fermentation is allowed to commence.

In addition to barley and the grape and the date, other fruits and grains were made to yield a kind of wine. Apples were used for this purpose, and a drink was got from them. Some scholars suppose that the word eider, which is employed to describe a strong drink

from apples, is derived from *sikera*, a word used by the Greeks to indicate a vinous drink made from apples, corn, grapes, dates, or any substance that will ferment.

The Egyptians, the Persians, the Jews, the Syrians, the Greeks, the Romans, all the ancient nations of antiquity of which we have correct record, learned how to make wine, and they all indulged in it more or less. With this fact we must couple one or two other facts which are essential to our knowledge.

In the first place, they only knew of wine. What in these days we call ardent spirit they did not know. They looked upon wine as a fluid of itself, a something quite different from water, just as many ignorant people do in the present day. They did not understand a secret we have had made known to us since their time, that wine, as a fluid, is indeed water with something else in it which we call spirit. They were ignorant that the water in wine is so much greater in quantity than the spirit, that if we put eighty-three wine glassfuls of water to seventeen wine glassfuls of the spirit, we should then have the amount of spirit present which distinguishes the strongest natural wine from water, and with a few small additions of saline substances, acids, albumen, sugar, and tannin, should have wine itself.

MISTAKES ABOUT THE USES OF WINES.

Under the misapprehension that they were drinking a fluid distinct altogether from water, the ancients may be pardoned for many of the mistakes they made. Wine appeared to them to be so abundantly supplied, that they seemed to have it for the asking for it. The water they employed for steeping the grain seemed to be turned into this new fluid, wine; and when we understand how

large a quantity of water they were really drinking in their wine, we can easily comprehend why many of them took such enormous quantities as we read of,—two or three gallons at a time,—without dying on the spot. They drank in quantity of spirit not much more, if any more, than some beersellers' draymen now drink of beer each day, and as they did not become dead drunk until they were positively surfeited with drinking, and became almost barrels or wine casks themselves, we can partly excuse them for commending a certain moderate use of wine. Wine drinking in those days was different, in point of fact, to what it is at present.

In our bad times habit has made men dissatisfied with wine as grapes and other fruits yield it. They must needs now concentrate the wine, by a method I will show the nature of in a more advanced Lesson, and must add concentrated strong spirit to wine to fortify it, as they express this abominable process. More than that, they must now take the concentrated drink itself, or spirit of wine, the pure spirit with half of water; and, adding water from positive necessity in order to enable them to swallow the burning stuff, drink it down as if it were pure water.

We are, then, much worse than the ancients were in regard to the use of strong drinks; but pray do not imagine that they were faultless, and that the wine they were wont to indulge in did them no harm. In their way of taking wine, mild as it was compared with our mode of drinking strong wines and liquids made from wine, they went far beyond the lines of safety, and suffered very much in mind, body, and estate. Some of their very greatest men, men who ruled and kept the world in awe, died from wine. Alexander the Great himself, that proud

Greek who sighed, after one of his grand victories, that he had not got another world to conquer, was so purblind he actually could not look into his own heart and see that in himself he had a world of worlds to conquer. For he, great as he was, died of his own evil habit of drinking wine to excess, and in his time there were, as there are in ours, thousands of men who were equally purblind and dead to the calls for their own safety. The ancients, as a consequence, went very far wrong; but, nevertheless, they did something that was wise, and the mention of what they did brings me to a second point of practical life relating to them.

Seeing what evils the drinking of wine, as wine, brought about, the ancient Romans before they became generally injured and enervated by luxury, passed a law by which they forbade all women from taking wine under any pretence; and if a woman or girl took any she was punished severely. It is said that the first kings of Rome permitted a man to kill his wife if she were discovered drinking wine, so debased did they consider a woman to be if she condescended to contract so degrading and fatal a habit. After a time this prohibition, though never perhaps withdrawn amongst the Romans, was neglected, a neglect which ages later the sage Seneca finds fault with, the manners of the women being so much changed for the worse when he lived. In those early days, also, the prohibition against the drinking of wine was extended to men until they had attained a certain age. Men were forbidden to take wine until they had reached the age of thirty years. This was a very strange rule, and as a matter of course not very logical; for why should that which was injurious to a man at twenty-nine cease to be injurious to him one year later? I suppose it was

thought that at thirty men had come to years of discretion, and could then be trusted to take wine in quantities that were not hurtful. If this were the object, it was, I am sorry to say, worthless; for wine at all ages easily becomes master of the man who makes it his friend and enemy.

QUESTIONS.

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| 1. What drink, like to wine, did the Egyptians invent?
2. What is the probable origin of the word beer?
3. What is the probable origin of the word cider?
4. What is wine composed of in its natural state?
5. What mistake did the ancients make about the nature of wine? | 6. In what do we differ from the ancients in taking vinous or strong drink?
7. What excuse for moderate drinking of wine might be made for the ancients?
8. Did they escape injury from their modes of drinking wine?
9. What laws did some of them pass to prevent injury from wine? |
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“Wisdom is obscured by wine.”—*Pliny the Elder*.

“This is the great fault of wine,
 It trips up the feet,
 It is a cunning wrestler.”—*Plautus*.

“Your drunken feasts declare your wickedness.”—*Ovid*.

IX.—HABITS OF DRINKING.

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| Ad-dic'ted , accustomed to.
Am-bas'sa-dors , ministers sent by one sovereign to the court of another.
An'ec-dote , a particular incident or fact.
A-pol'o-gise , to make an apology or excuse.
Ar'dent , hot, fiery, eager.
Be-falls' , happens to, occurs to.
Craze , a weak desire.
De-gen'e-ra-ted , passed from a good to a bad or worse state. | Fig'ur-at-ive , representing something else, typical.
Hab'it , custom, practice.
In-di-vid'u-al-ly , separately, by itself.
Phi-los'o-phers , persons skilled in the principles of nature, morality, and science.
Pre'ma-ture-ly , too soon, before the proper time.
Pre-tence' , pretext, excuse.
Pu'ny , very small.
Slake , to quench. |
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IN spite of the two facts that the ancients only drank wine or beer, liquors which contained a small quantity of strong or ardent spirit, and that they passed laws prohibiting the women and young men from taking wine; in spite of the circumstance that their wise men or philosophers and their

physicians explained the bad effects of wine; they fell, in course of time, into the evil habit of taking too much of it, and by that habit became greatly depraved and degenerated. This is a point I want particularly to impress on the mind, that the drinking of wine and of all that belongs to it in kind, soon begets a desire for the continuance of the habit and a craving for the agent which produces the habit. This habit may affect a man, it may affect a number of men, it may affect a nation. If men or women in private life acquire the habit, it sticks to them; they become slaves to it; they crave for the agent through which the habit is produced. If a body of men in a shop, in a village, in a city, acquire the habit, they soon become slaves to it; they crave for the agent which produces the habit. If a man in his house, or a woman in her house, gets up from work or rest many times in a day, and helps himself or herself to a glass of wine, beer, or spirit, nobody possessing common sense believes that such a proceeding is necessary; nay, the person who goes through the proceeding does not believe it either, but the habit claims the mastery.

In a town or village you may see a number of men who, at regular hours, leave their work, go to the bar of a public-house, call for something to drink, drink off what they order, lounge about and perhaps call for more, drinking all that they call for before they return to their work. Or one man meets another man, and before he has said "Good day," or "How d'ye do?" he will probably ask (if he wishes to be very friendly), "What will you take?" or "What will you drink?" or "What will you stand?" There is no kind of pretence that any drink was required after the manner it was called for in these instances. Not

a bit of it. It is habit that prompted the going to the bar, the drinking at the bar, and the treating or the being treated at the bar; and all that are concerned, the man who sells the drink, the man who buys it, and the man or men who let it pass down their throats, know if they would honestly admit it, that the whole proceeding is a mere foolish habit, attended with loss of money, loss of temper, loss of time, and loss of health.

What befalls a single man or woman, or a small number of men or women, befalls in like manner a nation, however great it may be. When a nation becomes habituated to strong drink, and its men and women become drinkers, by habit, it is doomed, as a nation: because as "sands make the mountains, moments the years, and trifles life," so the individual men and women make up the nation, which by their habits is corrupted.

I think I hear one of you saying in reply—"Men and women and people of towns and villages and nations make it a habit to do other things. They take their meals at certain times, they sleep at certain times, they work and play at certain times, and these, also, are habits. Why then is the habit of taking wine and strong drink worse than any other?" It is worse, for a very serious and remarkable reason. The habit is not simply a natural custom or act, it is a habit attended with a craving for that one particular habit beyond all others. If a man takes water to drink, he takes it to slake his thirst, and when the thirst is slaked nothing more is wanted. He does not go on taking more water. If he did, and went on drinking water until he permanently injured himself by doing so, we should say the man is mad, and I have no doubt we should shut him up in a lunatic asylum. But men do not acquire the desire or craze for water which

they do for wine, and herein lies the difference between these two liquids as drinks. We ask for what is rational and necessary of the water; we crave for the wine, and if we give way to the craving, we become insane. Whenever a person, indeed, craves for anything, his mind is wrong. If he crave for money and worship it, he is a miserable miser; if he crave for praise and for notice on all occasions, he is a conceited, wretched creature; if he crave for power, he is a tyrant so soon as the passion of craving becomes his master. So it is in respect to wine and strong drink. The man who craves for it is no longer strictly in his right mind. There is something wrong about him; he is in bad health; he is in a bad way; and surely and certainly he will soon, as a general rule, break up and die.

RESULTS OF THE HABIT.

All things that excite an intense passion or desire for them, or craving for them, are bad, and nothing more resolutely creates a desire for itself in the human breast than wine and strong drink. Wine and its allies make the person who indulges in them a part of themselves. They cry out, as it were, "Take me! take me!" and when they have once won their way, they persuade and persuade, even unto death, those who have been brought under their influence. What, again, is true of individuals and small communities is true of nations, and hence it has happened that every nation which has given way to the influence of wine and the luxury which has followed, has given way as men give way. In the days of Cambyses, the boasting King of Persia, a number of ambassadors were sent from that king to wait upon the chief of the Macrobian, and quietly inspect the state of his kingdom. The Macrobian chief, knowing well what

the design was, rose to the occasion. He showed the Persian ambassadors all his power. He let them know that his people lived to the age of one hundred and twenty years, while the Persians were short-lived. He gave the ambassadors a bow, which none but a Macrobian could bend, and he bade them tell their master that when he could send soldiers who could bend that bow, he might conquer Macrobia. He let the Persians stand by the side of his tall, fine men, and feel how puny and weak they were in comparison. These strong Macrobian were ignorant of the use of wine and strong drink. They lived on the simplest food, and greatly on milk, while the Persians revelled in wine, and brought the chief a present of palm wine as one of the choicest gifts of their kingdom.

As Persia became addicted to wine and luxurious living Persia fell. Herodotus, the father of history, narrates that, when the Persians were about to fight battles, they discussed at night the order of battle over their wine and reconsidered the decision in the morning, after they had become sober. When things had come to such a pass, it is no wonder that the great and mighty empire crumbled under the advance of less luxurious invading foes.

In time the Greek and the Roman powers suffered in the same way. It became in Rome a matter of credit or wonder for a man to be able to drink according to custom and at the same time to do good and useful work.

It is said often by those who wish to apologise for the use of wine as a drink, that great nations became great although they were wine-drinking nations. This is true and false. It is true if half the truth be told; it is false if the whole truth be told. The whole truth is that the great nations became great while they were simple in their habits, and became little when these habits changed

into love of wine and luxury. If great nations were true examples of greatness produced by wine and strong drink, then men and families and communities ought to become great by the same method. There is no one daring enough to say that this is what happens to men, families, and small communities; or that men, families, and towns, when they get into the habit of drinking vinous drinks, are not in a certain state and condition to fall away from strength to weakness, from wealth to poverty, from health to disease, from life to death. It is even the fact that the lower animals, if they become habituated to the use of strong drinks, as they can be taught to become, lose intelligence, power, and health, and prematurely die.

QUESTIONS.

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|---|---|
| 1. What is the first bad effect of wine and other strong drinks?
2. What foolish habits do men and women acquire from taking these drinks?
3. To what extent may the habit be carried?
4. In what respect does the drinking of wine differ from the drinking of water? | 5. What does craving for any particular thing indicate?
6. Relate the anecdote of Cambyzes, King of Persia, and the Macrobian chieftain.
7. What great nations fell from the use of wine and luxury?
8. What lessons do we gather from these events? |
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“ With caution taste the Circean cup,
 He that sips often, at last drinks it up.
 Habits are soon assumed, but when we strive
 To cast them off, 'tis being flayed alive.
 Called to the temple of impure delight,
 He that abstains, and he alone is right.”—*Cowper*.

“ In short, the custom of anything we do ripens into habit, and if we may take it that the word habit is a figurative word, then it may be said to cling to a man as closely, and to display its colours as conspicuously, as the dress he wears.”—*Rev. Richard Reade*.

PART II.

I.—THE ARABIANS AND ALCOHOL.

Com-bus'ti-ble , capable of being burnt.	Op-po-si'tion , resistance.
De-gra'ded , reduced in rank.	Par'ti-cles , minute portions, small pieces.
Fa-mil'i-ar , intimate, acquainted with.	Per cent. , by the hundred.
His-to'ri-an , a writer of history.	Per-chance' , by chance.
In-fu'sion , solutions of vegetable substances in water.	Phe-nom'en-on , anything unusual or remarkable.
In'stru-ments , tools, weapons.	Prod'ucts , things produced, results.
In-ter-dic'tion , prohibition.	Re-sult'ed , ensued, arose from.
Me-phit'ic , noxious, destructive to life.	Skimmed , taken from the top.
Myth-ol'o-gies , histories of heathen deities.	Spon-ta'ne-ous , of its own free will, force, or energy.
Nar'ra-tive , relation of a story or event.	Suc'cu-lent , full of juice.
Or-gan-i-za'tion , formation of organs, structure.	Tran-si'tion , change.
	Trans-la'ted , the sense of one language expressed in the words of another.
	Un-whole'some , unfavourable to health.

It is told of the Prophet Mahomet, the founder of the great Mahometan empire and religion, that when he was about to make, what is called by his followers, his night journey to heaven, the angel Gabriel brought to him three cups. One cup was filled with wine; the second was filled with milk; the third was filled with honey. The prophet took the second cup and drank the milk, as the most correct liquid to charge himself with before attempting so marvellous a flight. When he had partaken of the milk, "he heard," say the faithful, "a voice exclaiming, Mahomet, servant of Allah, thou hast made a fortunate choice, for hadst thou partaken of the wine, thy people would have deviated from the right path, and in their great enterprises would have lost their way."

It was believed by many of his people, that owing to

this circumstance, Mahomet gave the command that his followers should no longer indulge in wine, and his successes may be largely traced to this command. Before his time the Arabs were given to excess in the use of wine, and, fine soldiers as they undoubtedly were, they could hardly have performed the grand feats of war which they carried out had they not amended their ways in regard to the use of intoxicating drinks.

The learned scholar Sale, who translated the book of the Prophet Mahomet, called the Koran, a book which the Mahometans hold in the same reverence as the Christians and Jews hold the Bible, has given a different reason for the interdiction of the use of wine by the prophet. Mr. Sale teaches that wine and games of chance led to so much dissension amongst the followers of Mahomet that he commanded abstinence from wine as the means of safety and of success. Other equally good authorities believe that Mahomet was moved to this course of action by his desire, as a leader, to imitate the law and custom of Moses, by which the members of the priesthood were strictly forbidden to take wine or strong drink whenever they were about to undertake the duties of the priestly office. The words of command from Moses spoken by Aaron are :—

“Do not drink wine nor strong drink, thou nor thy sons with thee, when ye go into the tabernacle of the congregation, lest ye die; it shall be a statute for ever throughout your generations.”

“And that ye may put difference between holy and unholy, and between unclean and clean.”

Whichever view we take in explanation of the course followed by Mahomet in forbidding the use of wine, there can be no doubt that the act produced a remarkable effect for good amongst his people, and gave them long ages of power and influence and fame. In later times, other eminent commanders have led their armies to suc-

cessful triumphs over serious obstacles, and to the performance of glorious exploits, by the repetition of the same command.

In our readings up to this time we have had before us the names of wine, beer, palm wine, and various kinds of drinks which are made directly from fruits or corn and are used without any further preparation save clearing and storing up in jars, bottles, or other utensils that would hold them and keep them from the air. Once or twice, however, the words fermentation and spirit, or ardent spirit, have slipped into our narrative, and now we are advanced enough to inquire into the meaning of these phrases, and to learn how and why fermentation came into use, how and why ardent spirit came to be manufactured, and what ardent spirit is when it is manufactured. In discussing these subjects, we shall learn, when we come to the study of ardent spirit, that certain men of the nation which Mahomet founded did in after times become great men of science; that by them the art of making ardent spirit was acquired; and that from them we not only got the thing itself, but the name by which it is now generally known, and which we shall henceforth often use,—**Alcohol**.

FERMENTATION.

If you remember the Lessons of the earlier readings, which treated of the manufacture of wine, you will have in your minds the fact that after the grapes were plucked from the vines and their juice expressed, or after the corn was gathered and the grain boiled in water, or after the dates were long boiled in water, the liquids which resulted were set aside and allowed to undergo fermentation. The act of fermentation was compared to a process

of slow-heating, with frothing and motion. *Ferveo*, meaning, in Latin, I heat or boil, is the first person singular of the verb from whence the term comes.

We have no true history of the discovery of fermentation. It was, probably, as almost all these processes are, quite an accidental discovery; and we may presume it was very simple. As fire is easily produced, in nature, when a metal like iron strikes upon a piece of flint, or when two pieces of wood rub with great force together, like two boughs of trees made to move by a strong wind, so fermentation of the juice of ripe fruits, or of fluids made by steeping corn or fruit in water, is easily, and as it would seem spontaneously, set up. In the air there are floating innumerable little organic particles, which some persons think are living particles, and which, though they may not be visible to the naked eye, are very active when they come into contact with these ripe fruit juices or with infusions containing fruit or corn or other vegetable substances. These minute unseen particles, then, falling upon the grape juice or the infusion, begin to increase or grow there, and to start the change which is called fermentation.

Some men in the ancient world not knowing, perchance, the way or mode in which the process of fermentation was actually brought about, learned, nevertheless, the steps of that process so far as to discover how to carry it out practically. They discovered that when a fluid was fermenting there were four products as results:—

1. An air or fine invisible fume or vapour which came off in bubbles, and which, if a person breathed, soon made him cold and dark-coloured and insensible,—a deadly vapour.

2. A froth which rose on the top of the fermenting

juice or fluid, and which, being taken from the top and added to fresh juice or fluid, kindled the juice into quick fermentation and multiplied again.

3. Beneath the froth or ferment that was skimmed off, a thin odorous fluid, of varied colour and taste according to the nature of the fluid that was originally set to ferment.

4. At the bottom of this clear fluid a mass of heavy, half-solid stuff, which separated from the liquid above when the liquid was allowed to rest.

The first of these products was a mephitic or poisonous air; the second was a ferment; the third, the fluid beneath the froth, was wine; the fourth was dregs or lees.

It is very interesting to trace in this discovery the same probable steps of discovery as occurred when fire was first made by man. There was the spontaneous act of fire struck out when rude men making, I daresay, for themselves useful instruments, knives, arrow-heads or hammers, struck on iron with flint, and got the spark which kindled dry leaves or other combustible things into a fire. Then there was the art of taking a bit of this fire and making from it another fire, which would burn in a manner so familiar that every child would understand it. It is mere custom now this first art of making a fire, and we think nothing of it. It was once a discovery, strange, wonderful, nay, we may say to those who made it, awful, and in matter of importance to mankind second to none other. No wonder those who invented the mythologies raised almost into a god the man who as they thought had first fetched fire from heaven.

The art of fermentation was gathered from the simplest observation of natural phenomena. Nature lighted up the fermentation in the fruit juice, and supplied the ferment without which the change would not take place.

Man imitating nature, not by making the ferment, for he no more could have made that than he could have made fire, but by imitating nature, by adding ferment to fluid capable of fermenting, made such fluid undergo fermentation.

FIRST TASTINGS OF FERMENTED DRINKS.

What led the man first to taste the fluid that he found between the froth on the top and the lees below? That we cannot say. Unfortunately when he did begin to taste, it took such hold of him that he soon began to sing its praises and to declare too frequently he could not live without it. To the savage it was not like a mortal thing at all. It lifted him, as he might think, into a new and higher sphere of life; it degraded him, as we know, to the lowest. It introduced, we may really say, a new kind of organization of man into the world—a change that was destined to last for ages, to last until the evil it had done became too sad and solemn for good and wise men to bear any longer.

The practice of exciting fermentation, and of obtaining the coveted liquor, once made known, the knowledge went on until from a large number of vegetable substances wine was obtained, or some fluid which had similar properties. From the expressed juice of the grape as a fermentable substance the transition was easy to the juice of other fruits, the mulberry, the apple, the pear, various berries, the currant, the peach, the prune, the date. From these again the transition was easy to those juices which exude from trees, as from the eastern palm; and from these again to such similar-looking substances as manna and honey. From fruits, once more, it was an easy transition to seeds, and from seeds that were soft

and succulent or juicy to seeds that were dry and hard, what we now call grains, such as wheat, barley, and maize.

Whatever, in short, was fermentable and was found to be so, was made into a liquor of the nature of wine; and thus there came into use not only the hundred and ninety-five wines to which the historian Pliny refers, but many hundreds of other kinds, different ages adding different specimens, while in some countries barley wine, or beer, became extremely popular. In our own country beer made its way very early, and about the fourteenth century the practice came in of adding hops to beer to give a better flavour and make the beer keep well. At first this was not liked, and in the reign of Henry the Seventh, whom you will remember as the Duke of Richmond who conquered Richard the Third at the battle of Bosworth Field, the use of hops was forbidden on the ground that they spoiled the beer and rendered it unwholesome. This act was confirmed in the next reign, that of Henry the Eighth. At last, in spite of opposition, the hops won their way into public favour, and the growing of hops became an important addition to agriculture and to trade. The county of Kent became especially famous for its hop fields, and has continued so up to the present hour.

The beer or barley wine was never so strong a drink as wine from the grape. It never contained less, perhaps, at any time than ninety per cent. of water, and the weaker sorts of it contained as much as ninety-five parts of water in a hundred. In last century a very clever chemist named Neumann analysed beer, and found the quantity of water in different kinds to be as I have stated above; and in this day, I and others have found the same. When, therefore, a man has bought a hundred

pints of "beer," and paid threepence a pint for it, he has paid three hundred pence, or one pound five shillings (£1, 5s.) for ninety to ninety-five pints of simple water, with five to ten pints of ardent spirit or alcohol.

QUESTIONS.

1. What particular reasons are given for the command of Mahomet against the use of wine?
2. What command of a similar kind was given in the Bible, and to whom?
3. What is the origin and meaning of the word fermentation?
4. How probably was fermentation discovered?
5. When a fluid like grape juice is fermented what four products are formed?
6. What are the properties of each of these products?
7. What is necessary for the occurrence of fermentation?
8. Name several substances that will undergo fermentation?
9. When a man buys one hundred pints of the fermented drink called "beer," at a cost of one pound five shillings, how many pints of water does he get for his money?

"Then does men's life become one vast disease,
When once they seek their ills by ills to cure."

—*Sophocles.*

II.—WINE AND WATER.

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| Ab-sorb'ing , imbibing, taking up. | E-lix'ir , a refined spirit, a cordial. |
| Al'chem-ist , one who practises alchemy, a pretended science. | Fla'vour-ing , communicating some quality that effects the taste or smell. |
| Al-em'bic , a chemical vessel for distillation. | Met'al , body or substance usually lustrous and insoluble in water. |
| Ar'dent , hot, burning, fiery. | Ov'er-pow'er-ing , bearing down by force. |
| Con-dense' , to make close or thick. | O-ver-whelm'ing , overpowering, crushing. |
| Crude , raw, not altered by artificial process. | Pass'ion-less , calm, not easily excited. |
| De-com-po-si'tion , analysis, separation of the constituent parts of a compound body. | Rem'e-dy , that which cures a disease or repairs a loss or disaster. |
| Dis-guis'es , concealments. | Still , a vessel used in the distillation of liquids, an alembic. |
| Ef-fer-vesc'ent , bubbling from the disengagement of gas. | |
| E'ther , a very light, volatile, and inflammable fluid. | |

WE know now that for many ages wine was looked upon as quite a distinct drink, and as something totally different from water. Wine has usually a colour, and sparkles in the glass; water is colourless and clear as crystal. Wine has taste and flavour and odour; water is tasteless and odourless. Wine is the blood of the grape, and in some respects seems akin to the blood of man; water is of all

fluids the least like blood. Wine when drunken makes the face flush, the eyes sparkle, the heart leap, the pulses quicken, the veins full; water when drunken does none of these acts, and seems to do nothing but respond to the natural wish for drink. Wine makes the lips and tongue parched and dry, the drinker athirst; water keeps the lips and tongue moist, and quenches the thirst of the drinker. Wine, when it is taken, sets all the passions aglow, and dulls the reason, bids men enjoy themselves and reason not; water creates no stir of passion, and leaves the reason free.

Wine makes for itself a first and second and third and fourth claim on the drinker, so that the more of it he takes, the more of it he desires—it is so overwhelming in the warmth of its friendship. Water satisfies the drinker after one good draught, makes no further claim on him than is just consistent with its duty, leads him never to take more and more, and has no seeming warmth in its friendship. Wine presents itself under many forms, which appear to be distinct: it is new, it is old; it is sweet, it is sour; it is sharp, it is soft; it is sparkling, it is effervescent, it is still. Water is ever the same. Wine must be petted and cherished, stored up in special skins and special cases, styled by particular names, praised under special titles, and heartily liked or disliked like a child of passion. Water is everywhere; it has one name, no more; it has one quality; it hurries away out of the earth by brooks and rivulets and rivers into the absorbing sea, where it is undrinkable; or it pours down from the clouds, as if the gods were tired of it. It is no child of passion! Let the cattle and the dogs, and the wild beasts alone drink water. Let the man have the overpowering drink, the blood of the fermented grape,—wine!

Alas! for the poetic dream. Science, poetic too in her way, but passionless, destroys in those crucibles of hers which men call laboratories, this illusion. She tells that, when one or two disguises are removed, even blood is water. As to wine, that is mere dirty water—sixteen bottles or cups or any other equal measures of water pure and simple, from the clouds and earth, to one poor bottle or cup of a burning, fiery fluid, which has been called ardent spirit, or spirit of wine, or alcohol, together with some little colouring matter, a little acid, a little sugar, and a little cinder dust.

It is pitiful to think that throughout the ages men who have called themselves wine drinkers have been water drinkers after all; that men who have called themselves wine merchants have been water merchants; that men who have bought and who buy wines at fabulous prices, have been buying and still are buying water. A dozen of very choice champagne, bought at a cost of five pounds ten shillings, consisted, when it was all measured out, of three hundred ounces or fifteen pints of fluid, of which thirteen pints and a half were pure water, the rest ardent spirit, with a little carbonic acid, some colouring matter like burnt sugar, a light flavouring ether—in almost infinitesimal proportion,—and a trace of cinder dust. Sensible people think that five pounds ten shillings is a heavy sum to pay for thirteen pints and a half of water and one pint and a half of spirit. They could easily show how the man who spent that money could have bought with it as much good food as would have fed him well for one month. He paid, therefore, for the trouble of getting the ardent spirit a very heavy price, a price he would not have paid had he been a wise and prudent man.

DISTILLATION.

Let us now enquire what is this ardent spirit for which so much is paid in money value. It is clearly something that mixes well with water in strong drink, and it is clearly something that has a peculiar effect on man. It makes the difference which exists between ordinary water and strong drink. It is called the spirit of wine, it is called ardent spirit, it is called alcohol. So much we know. What we want to know further is, how it was first got from wine, why it was called a spirit, what it is like when we see it and examine it, and for what reason it is said to be "ardent" and "alcohol."

To begin with the beginning, the spirit of wine was got by a process called distillation, a term derived from the Latin word meaning to pass over drop by drop or little by little.

Like all the processes and arts which man invents, or thinks that he invents, the process of distillation is literally, and in more senses than one, as old as the hills. It is a process adopted by nature herself. Raining is distilling. When the heat of the sun tells on the earth, the water on the earth rises to the clouds in vapour. If the water on the earth has something mixed with it so heavy that it will not rise, the water rises of itself, and leaves behind the matters that will not rise.

For example, if sea water be exposed to the sun in a shallow basin, the water will rise. But sea water, as you know, contains salt, and the salt will not rise. The water will evaporate, the salt will remain. The water will rise as vapour into the air, and there, perfectly pure, it will condense from the state of invisible vapour in which it ascended, and will become a cloud. If it condense on a

very high mountain, like Ben Nevis in Scotland, it will condense as snow or ice. When it is cooled and condensed, if it be not positively solidified as snow or ice, it will fall as rain water. It has been distilled. It has been separated from the substances it contained, and it returns, from the state of mist or vapour in which it was raised from the earth back to the earth, as water.

In the history of human science, man began once on a small scale to imitate nature. He took water in which substances like salt were dissolved; he put this water into a pan over a fire; he drove off the water by the heat and retained the residue. He went a step farther. He collected the steam or vapour, that rose from the surface of the heated water, in a long pipe which was made tapering as it ascended, and which turned over as a small pipe. He found that at a certain height the vapour condensed and would trickle back through the descending pipe, so as to be caught again in the form of water, freed from what it had before held in solution.

When once man could distil water, he soon began to distil other fluids and to collect the distillate, that is to say, the substance or fluid that distilled over.

The discovery, though after all it was but a copy from nature, was a turning-point in the science of chemistry. Directly men could distil they could do the most remarkable things. They could, as it appeared, change one substance into another.

The first chemist who is supposed to have practised distillation was a follower of Mahomet, a Saracen named Geber, who is believed to have been a native of Seville, in Spain, in the ninth century of the Christian era. Geber states that the motive of distillation is to free liquors from drugs and to preserve them fresh, since

everything distilled possesses greater purity and is less liable to putrescency. He tells us also that the object of distillation by a still is to get water free from earthy substances by which both medicines and spirits are injured. Then he describes the different modes of distilling; and a still, and oils and various substances which he had himself distilled. He does not appear to have distilled wine.

The distillation of wine was, I believe, first made by another follower of Mahomet, an Arabian chemist who lived in the eleventh century, and whose name was Casa or Albucasis. This chemist put wine into a vessel called a retort or crucible, applied a gentle warmth, collected the fluid that came over, and found it was something different to water. He found it was lighter than water; he found it would burn; he called it a spirit, the spirit got from wine, spirit of wine.

When they first obtained this spirit in its pure form, the last thing, I suppose, the chemists ever dreamed of was taking it as a drink. It was "fire water." It burned the lips and tongue and throat. It had the most extraordinary power of dissolving things that water would not touch. To them this spirit was a golden secret. Oils, resins, gums, balsams, which had never been dissolved before were easily dissolved now. There is an Indian gum, benzoin, called sometimes a balsam, which, dissolved in this spirit and made into a fluid, must have been a fortune to its possessors, for it became a balsam for healing wounds, called Commanders' balsam or Friar's balsam. It was soon one of the great cure-all's for wounds and injuries, and without any doubt it was a splendid remedy.

DISTILLED SPIRIT.

The famous spirit of wine burns like oil. It does not give much light, but so pure is its flame that it actually produces no smoke as it burns. Burned in a lamp it will cause fluids to boil in coppers and dishes and kettles, and never blacken the surfaces of the vessels in the least. It will also dissolve colours for the artists, it will dissolve colours to put on ladies' faces to beautify them, as they foolishly believe. And still, perhaps strangest thing of all, this spirit will preserve different substances from decay and decomposition. If pieces of the flesh of dead animals are put into it, it will make the meat white, but it will entirely prevent it from putrefying. It will keep fruit and vegetables also from becoming changed or decomposed.

The marvellous spirit was put to another test by the adepts. They had formed an idea that some day a medicine would be found that would cause universal health and be an elixir of life. Here surely was the fluid. They named it, according to their hopes, *aqua vitæ*, water of life. Had they named it according to knowledge, they ought to have named it *aqua mortis*, water of death.

The wonderful spirit was tried for yet another and very selfish purpose. Those old chemists, or as they were called in the days of which we are speaking, from the eleventh to the sixteenth century, alchemists, were filled with the belief that they could turn one substance into another, and one metal into another metal. If this could be done, why should they not turn lead into silver, and some other metals into gold? Here was an opening to see what this new spirit would do in that direction. It did nothing directly of that kind, but the experiments

which were made led to some useful results which were as good as gold.

Still no one at first seems to have taken spirit of wine as a common drink, except when he took it in wine or beer or other fermented fluid that had not been distilled; and nobody knows when the unfortunate custom of drinking "spirits" commenced. Whoever first commenced it did one of the worst deeds that have ever been done. He has been the cause of the deaths of millions of his fellow-creatures and of an amount of sin, suffering, and crime, which no one can possibly calculate.

Mr. Stanford, a learned friend of mine, who has lately died, came to the conclusion that the first spirit made or used for drinking was distilled from corn wine, and was what is now called whisky. He says it was made by the monks in Ireland about the year 1260 A.D. They, he is of opinion, got the secret from the Arabs or Moors, who called an impure spirit by that truly false name of *aqua vite*—water of life. This translated into the Erse tongue, the native Irish language, would be *usige biatha*, which was afterwards corrupted by being shortened into one word, *usquebaugh*, which word in its turn got shortened again into *usque*, pronounced *whisky*.

After that came into use another crude distilled fluid from wine, in which spirit was distilled over with its equal part of water, but which would burn. This was called brantwein, from the German "brennen"—to burn, and from this it came into our language as brandy. Much later came gin from the French word *ginèvre*, from the Italian word *ginepro*, from the Latin word *juniperus*,—in English juniper,—the name of a tree, the berries of which, used as a flavouring substance in the distillation of the spirit, gives to gin its peculiar character. Gin

came into use in the latter part of the seventeenth century, and soon showed itself to be a very bad introduction. A picture called "Gin Alley," by the great artist Hogarth, is a sufficient proof of the terrible mischief of this drink in the last century, a mischief which I am sorry to say remains to this day. So terribly does gin injure the bodies of men, that it causes a particular disease of the liver called "gin drinkers' liver," a disease which kills all whom it affects.

The last of these distilled spirits, which I may most justly call distilled poisons, is the nauseous, bad-smelling drink known as "rum." Rum gets its name most probably from the last syllable of the word *saccarum*, a corruption of the Latin word for sugar, *saccharum*, the spirit from which rum is distilled being got from sugar.

Before we close this reading, let us sum up the facts we have learned respecting the history of strong drinks.

There was a first stage of making wine or beer by fermentation. This stage extended from the earliest known history until the time of the chemists, say about the eleventh century of the Christian era.

There was a second stage, when there was distilled from the wine a light spirit first called spirit of wine, afterwards alcohol.

There was a third stage, when this subtle or distilled spirit from wine was applied, in its refined and pure state, to the uses of the arts and sciences.

There was a fourth stage, comparatively modern, when this same process of distillation was applied to the production of various alcoholic drinks, such as brandy, gin, whisky, and rum.

QUESTIONS.

1. When a man buys a dozen of champagne measuring fifteen pints of fluid for five pounds ten shillings, how many pints of water may he get for his money?
2. How much ardent spirit may he get?
3. What was ardent spirit first got from?
4. By what process was it obtained?
5. What is the character of that process, and what is it like in nature?
6. Who first applied the process to wine?
7. What did the early chemists find in ardent spirit that distinguished it from water?
8. To what purposes did they first apply ardent spirit?
9. Under what names did ardent spirits come into use as drinks, and what were the origins of those names?

“Amid such a profusion of information and knowledge, we need not be surprised at the discoveries of the Saracens. In chemistry they excelled all nations which had gone before them. They first invented and named the alembic, for the purposes of distillation. Their speculation and visionary hope of finding an elixir of immortal health led them to the discovery of alcohol, and entailed upon posterity the manufacture of a beverage, to millions a curse.”
—*Morewood.*

III.—ALCOHOL.

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| <p>A-cet'ic, relating to vinegar; sour.</p> <p>Ad-dict'ed, habituated, devoted.</p> <p>A-nal'o-gies, agreements, likenesses.</p> <p>Con'sti-tute, to put together; to form.</p> <p>Com-par'a-tive-ly, by comparison; not positive.</p> <p>De'tails, particulars.</p> <p>El-e-ment'ar-y, primary, simple, uncombined.</p> <p>Ex-clu'sive-ly, exclusion of everything else; without participation.</p> <p>Fruit-y, like fruit; having the qualities of fruit.</p> | <p>Hy-poth'e-sis, a supposition; something not proved, but assumed for the purpose of argument.</p> <p>Mar'gin, an edge; that which borders anything.</p> <p>Sci-en-tific, according to principles of science.</p> <p>Spe-cif'ic gravity, the weight of a body compared with another of equal bulk, which is taken as a standard.</p> <p>Stand'ard, that which is established; a test.</p> <p>Un-civ'il-ised, not reclaimed from savage life.</p> |
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THE substance called spirit of wine, which the old chemists got by the process of distillation, is a clear white fluid, with an odour peculiar to itself, an odour rather sharp and fruity. If a little of it, even diluted with an equal part of water, be put on the tongue it creates a burning sensation, and from that cause it has been called by the simple natives of uncivilised countries “fire-water,” a very

good and expressive term ; for in the body this spirit may produce effects which are almost as bad as those which fire itself might produce. Some scholars think that this fact was intended to be shown in the fable about Prometheus, at whose liver a vulture was said to be continually gnawing and preying, as a punishment. The vulture was wine, and the strength of it was the gnawing, burning spirit of that liquor. The spirit of wine, as you look at it in a closed glass bottle, bears a close appearance to limpid water. You may, however, soon distinguish a difference between it and water by other tests than those of smell and taste, good as these are in their way. It is lighter than water. If you were to take a little bottle that will hold just 1000 grains of water when the weight of the bottle was duly poised in the scale, and were to fill that little bottle with absolute spirit of wine, you would find that the weight would be 795 grains, taking the water at 1000 as a standard by which to calculate weight. .795 is therefore said to be the specific gravity of the pure or absolute spirit of wine.

If a little of the spirit were put on the fire it would be seen to burn, and if it were mixed with water to half its own measure, it would still burn. If it were put into a vessel and boiled, it would be found to boil at a less heat than water requires at the same pressure of the air. Water boils at 212° Fahrenheit under the ordinary atmospheric pressure ; the spirit boils at 40° lower—namely, at 172°. It would be found to mix with water in all proportions.

All these facts the old chemists knew, I daresay ; and they possibly knew the difference of weight between water and spirit, although they might not have expressed it as we do. As chemistry progressed they began to learn more, and to speculate as to the nature of this spirit, the interest

in which seems never to have declined since it began. Amongst other things which they did in regard to this spirit was to give it a peculiar name. They called it alcohol. The origin of this word is Arabic. Al'ka-hol meant, amongst the Arabs, a very fine powder used by the women of the East to tinge or dye the hair and the margin or edge of the eyelids. Afterwards the same name was applied to any very fine powder or essence, and so it became applied to this fine spirit from wine. The first person I can find who refers to the word in this sense is one Dr. Nicholas Lemert, who wrote a book upon chemistry in the year 1698 A.D. He says that the word is used to express a very fine spirit, and that the spirit of wine well rectified is called the alcohol of wine.

Once introduced, this word alcohol came into common use, and now we use it almost exclusively. We say alcohol when we refer to pure spirit of wine; and we speak of all drinks that contain alcohol,—brandy, rum, gin, whisky, wine, ale, beer, and so on,—as alcoholic drinks or beverages. When persons are addicted to the taking of these drinks until they are distinctly affected by them, we say of them sometimes that they are “alcoholics,” or we say they constitute an “alcoholic class” of the community. When, again, disease comes on from the taking of alcohol, as it often does, that is said to be “alcoholic disease,” or effect of “alcoholism.” There is a kind of consumption of the lungs produced by the excessive indulgence in alcohol, and that is called alcoholic consumption. Whenever, then, you hear the words alcohol, alcoholic, alcoholics, alcoholic drinks, alcoholic diseases, alcoholism, you will know that they refer to effects of the pure spirit of wine.

The ancient chemists keeping up their scientific interest in alcohol, formed an opinion, called in the language

of science a hypothesis, that alcohol was water combined with elementary fire. Whatever would burn must, they thought, contain fire, a very natural and clever supposition. When they burned alcohol they found water left in the jar in which they burned it. If you were to repeat their experiment, if you were to set fire to the wick of a lamp that was charged with spirit or alcohol, and were to hold over the flame a large open-mouthed glass globe, you would find a fluid forming in the globe above the flame; and if you collected that fluid and examined it carefully, it would turn out to be water pure and simple. So, you see, it was very natural for the chemists to say that alcohol was fire and water. The spirit burned and they saw the fire which it gave forth. The spirit yielded a fluid while it was burning, and that fluid was water. It was as plain to them as A B C, that alcohol was composed of fire combined with water.

In these days we do not describe alcohol in this simple manner. We do not look upon a thing which will burn as a thing that actually contains fire, although we are coming back to a view very near to this. We do not, as the older chemists did, look upon water as an element or as a substance that cannot be divided into any minuter division of parts. We say now that alcohol is an organic fluid derived from the fermentation of the juice of the grape, from the saccharine or sugary part of the juice, and that it is a fluid in which one part of one of the elements that make up water has been replaced by something different. As I want you to understand this matter clearly, I must enter into a few details in explanation.

COMPOSITION OF ALCOHOL.

The juice of the grape, when it is freshly expressed, contains, in addition to the large quantity of water in it, many

other substances, as gluten and albumen, and especially glucose or grape sugar. Barley, after it has been malted, contains the sugar, and all substances that are capable of alcoholic fermentation contain sugar. Sugar alone, when it is made to undergo fermentation, yields alcohol. Sugar, whether derived from the cane plant (common sugar), or from the grape (grape sugar), contains the elements hydrogen and oxygen, in the proportion to form water, in combination with the element called carbon, which, in an impure form, is represented in the substance called soot.

Sugar, keep in mind, is water combined with this carbon, and if you put sugar into a flame you get a black mass which is carbon. Water is a compound of two elements called oxygen and hydrogen. Sugar, therefore, is made up of three elements, namely, oxygen and hydrogen, in their proper proportions to form water, and carbon. Cane sugar contains 22 parts of hydrogen, 11 parts of oxygen, and 12 parts of carbon. Grape sugar contains 12 parts of hydrogen, 6 parts of oxygen, and 6 parts of carbon.

In the process of fermentation, under the influence of the ferment, which we have seen to be an organic and some think living substance, two new products are formed—a poisonous gas, composed of oxygen and carbon, in the proportion of one part of carbon to two of oxygen, and called carbonic dioxide; and the fluid called alcohol, which is composed of hydrogen 6 parts, oxygen 1 part, and carbon 2 parts. This newly produced fluid remains in the liquid mixed with water, from which, as it is lighter than water, it can be distilled at a proper temperature, and collected as alcohol.

Alcohol is then, as you see, composed of three elements—hydrogen, oxygen, and carbon; and if we merely looked

at the elements of which it is made up, we should say they were present in the following proportion or equivalents.

6 parts hydrogen.
1 part oxygen.
2 parts carbon.

But this really is not the order in which they are arranged. It often happens in chemical combination that two elements join together to make a compound which has itself the characters of an element, and is called a radical. That is the case here. Here two parts of carbon combine with five parts of hydrogen to make up a compound which is called ethyl. Thus—

2 parts carbon }
5 parts hydrogen } The radical ethyl.

Alcohol, then, as it exists in our common drinks, is composed as follows:—

1 part ethyl } Carbon 2.
1 part hydrogen. } Hydrogen 5.
1 part oxygen.

If we compare water with alcohol, the comparison stands as follows:—

WATER.		ALCOHOL.
2 parts hydrogen.		1 part ethyl.
1 part oxygen.		1 part hydrogen.
		1 part oxygen.

So alcohol is, in fact, water in which the radical ethyl has taken the place of one part of hydrogen, and the alcohol of wine, spirits, beer, and other common drinks is called *ethylic* alcohol, because its radical is ethyl.

You will perhaps wonder why I have spent so much time in explaining the composition of alcohol as we at this day know it. I would not, you may be sure, have taken so much trouble if I had not had an important object in view.

OTHER ALCOHOLS.

Until comparatively recent times the most scientific men imagined there was only one alcohol, the alcohol that is present in wine and other well-known liquors. Now we have found out that there are many alcohols, all constructed on the same general plan as the alcohol of wine, and differing only in respect to the amount of carbon and hydrogen that is present in the radical that takes the place of the hydrogen of water. Let me give you two examples.

In the distillation of wood there is obtained a light spirit which is named *methylic* alcohol. In this spirit the radical present is known as methyl, and it contains—

1 part carbon	}	The radical methyl.
3 parts hydrogen		

Methylic alcohol, then, is composed as follows:—

1 part methyl	}	Carbon 1.
1 part hydrogen.		Hydrogen 3.
1 part oxygen.		

If we compare it with water, it is:—

WATER.	METHYLIC ALCOHOL.
2 parts hydrogen.	1 part methyl.
1 part oxygen.	1 part hydrogen.
	1 part oxygen.

Methylic alcohol contains one part less carbon than ethylic alcohol, and two parts less hydrogen. It is therefore a lighter fluid.

From potatoes another alcohol can be obtained by fermentation and distillation, which alcohol in the crude state is called fusel oil, and in the pure state is called *amylic* alcohol, from the Latin word *amylum*, starch, of which the potato is largely composed, and from the fermentation of which the alcohol is obtained. Amylic

alcohol has for its radical a chemical body called amyl, the composition of which is—

5 parts carbon	}	The radical amyl.
11 parts hydrogen		

Amylic alcohol is composed as follows:—

1 part amyl	}	Carbon 5.
1 part hydrogen.		Hydrogen 11.
1 part oxygen.		

If we compare it with water, it is:—

WATER.		AMYLIC ALCOHOL.
2 parts hydrogen.		1 part amyl.
1 part oxygen.		1 part hydrogen.
		1 part oxygen.

Amylic alcohol contains three parts more carbon and six parts more hydrogen than ethylic. It is therefore heavier, and requires more heat to boil it. It requires 270° of heat on Fahrenheit's scale to make it boil at the ordinary atmospheric pressure, and it is insoluble in water.

If you burn methylic and ethylic alcohols they yield no smoke in the burning, because the whole of the carbon in them is consumed. If you burn amylic alcohol it gives a smoke which, on a white plate, causes a black layer of carbon, because the whole of the carbon is not consumed in ordinary burning.

I could give you other examples of different alcohols, but I wish to do no more than impress on your minds this great truth, that the alcohol which is present in our common spirituous drinks or beverages is only one of a large family which, by mere accident in the history of man, came into use as a drink. For the matter of effect on the body and mind, the alcohol distilled from wood—methylic—when it is quite pure, is less hurtful than ethylic or grape and grain spirit; but because it is not the fashion to drink it, nobody drinks it, or thinks of such an act.

If you were to offer a man a drink of pure spirit, he would say, in all probability, that you insulted him, or that you proposed to do him some great harm; whereas, if you offered him the same amount of ethylic spirit in brandy, rum, whisky, or gin, though it would be worse for him, he would say you were a fine fellow. Such is the effect of custom on the human mind.

I have only two facts more to tell you about these alcohols. If you leave wine or beer in the air its alcohol becomes sour and an acid is formed which is called by the chemists acetic acid, and by the common people vinegar. In like manner the other alcohols can be made to yield their acids or vinegars.

By another process we can make ordinary alcohol yield a light fluid called its ether, and we can also make the other alcohols yield their ethers. The analogies of the various alcohols are perfect.

QUESTIONS.

- | | |
|---|--|
| 1. Describe the general character of spirit of wine.
2. How does the spirit of wine differ generally from water?
3. Why was spirit of wine called alcohol?
4. What did the old chemists think alcohol was made of? | 5. What is it made of?
6. How does alcohol differ chemically from water?
7. Will any other substances than fruit and grain yield an alcohol?
8. In what respects do various alcohols resemble one another?
9. In what respects do they differ? |
|---|--|

“Alcohol and alcoholic liquids are prepared in large quantities by the fermentation of sugar derived from various sources. The fermented liquid is distilled, and the dilute aqueous spirit thus separated from non-volatile impurities is obtained in a more concentrated form by repeated rectifications, as it boils at a lower temperature than water. Alcohol cannot, however, be completely separated from water by simple distillation; the strongest spirit which can thus be prepared containing 10 per cent. of water. To withdraw all the water, the spirit must be distilled with some substance capable of combining with water, such as potassium carbonate, or quick lime. The pure liquid thus obtained is termed *absolute alcohol*.”—*Professor Roscoe*.

IV.—ALCOHOL AND ANIMAL WARMTH.

Cor-re-spond'ing, similar, like.
De-ferr'ed, put off; postponed to a future time.
De-vel'op-ed, unfolded, laid open.
Gauge, to measure, to find a standard of measure.
Griev'an-ces, injuries implying a sense of wrong.
In-de-cis'ion, want of settled purpose or resolution.
In-va'ri-a-ble, without change.
In-ves-ti-ga'tion, the process of searching for truth or facts.
Maud'lin, stupid, feeble.

Me-thod'ic-al, in good order, regular.
Par-a-ly'sed, affected with palsy, deprived of power in a limb or part of the body.
Pre-cis'ion, exactness, accuracy.
Sen-ti-ment'al, abounding in sentiment.
Stim'u-lant, a substance that excites to transient action.
Sys-tem-at'ic, proceeding on a regular plan.
Trem'u-lous-ness, trembling in a slight degree.

WE have now, I trust, fairly in our minds a correct notion of ardent spirit, spirit of wine, in so far as its physical properties are concerned. It will be our next step to learn what is the action of this spirit on men and women who drink it, when they drink the common drinks, brandy, rum, gin, whisky, different sorts of wines, beer, ale, porter, cider, perry, and the other various liquors containing it which are sold at public-houses and at wine and spirit stores.

I must tell you at once that I do not take these drinks now, although I did for many years of my life, when I knew no better. I should tell you also that I did not give up drinking them, as many good and wise people have done, simply because I wanted to set an example of goodness. On the contrary, I did not like at first to leave off taking them. It so happened, however, that some years ago I was obliged, as a man of science, to inquire how the spirit of wine acts on the body; and in telling you the results of this inquiry, I shall give the reasons why I became a total abstainer from the use of the spirit, and why I want to induce every one else also

to abstain from it, in whatever form he may meet it, and by whomsoever he may be pressed to take it

I began by experiment to test the action of alcohol on animal bodies, and I found some remarkable facts, which I told originally to the scientific world, and which afterwards had a singular interest for total abstainers. If you were making the same investigation you would probably follow the same course that I did. I had a table printed, on which I put down on one side a list of questions as to the effect of alcohol on the body. Does it make the body warmer or colder? What is its effect upon the heart? What is its effect upon the other organs? Does it make the muscles stronger for work, or does it weaken them? What is its effect upon the organs of sense? Putting everything down in a systematic and orderly way, the results were detailed with the precision and method which belong to such pursuits. I was much surprised at what I found out, and so great was my astonishment at some of the first results, that I deferred to publish them, in order to go over my experiments again. I was quite content to take that step, for as I felt a doubt in my own mind, I thought it best to make assurance doubly sure, and I was able again to elicit, from new inquiry, the same facts.

The first fact with regard to the action of alcohol on the body related to the animal temperature or warmth. We have now got very refined methods of determining warmth or temperature of the body. We know how to tell at what temperature the body is working. The human body works almost at a fixed temperature. All over the world it works at nearly the same temperature. A man in the polar regions, if he be in good health, will have the same warmth in his blood as a man in the tropics

within half or a full degree. But a man in the polar regions has to take more heat-producing food, and has to cover himself up very closely to sustain his heat; while the man in the tropics will have to take less heat-producing food, and to wear light clothing, because he will perspire freely. So there is established an equalization of 98.4 degrees on Fahrenheit's scale as the mean temperature of the body.

When we take a small quantity of wine or other alcoholic stimulant we soon feel a little warmer. If you observe persons at table a short time after taking wine, they look very warm, their faces are flushed, and altogether they appear to be heated. They say they are heated, and indeed they are. I was leaving a hotel one night where I had been dining with some friends, and one of them who had taken a pint of wine or more during dinner, while shaking hands with me, as we came out, said: "How cold you are; you want a little wine to warm you up." "It cannot be that I am cold," I replied; "it is you who are hot." "Oh, no," said he, "it is the cold water you have been drinking all the evening, and now you want a little wine to warm you." Well, I took out my thermometer on the spot and found that my temperature was perfectly natural. It was his, as we discovered, that was at that moment between two and three degrees above what was natural.

I found in experiment always this same fact about alcohol in relation to its effects on the body. I found that in a little time after taking it in certain fixed quantities, it did apparently warm the body, but that very soon after this flush of warmth had passed away, the natural temperature of the body suddenly fell two or three degrees, and that it required six or seven hours to effect a change towards raising of the temperature, and two or three days

to recover the complete natural condition. I was led, therefore, to see that, though alcohol created a sense of warmth, the real and ultimate effect of it was to bank up and keep down the fire of life. This was proved with the inferior animals, and when alcohol was given to them in sufficient quantities, they even died from the cold it caused. If a couple of pigeons were fed side by side, and if one were put under the influence of alcohol whilst the other was kept free from it, and if the two birds were left in a dovecot on a cold night, when the temperature was below freezing point, the one fed simply on natural food would be found alive and as well as ever the next morning, whereas the one that had alcohol as well as food would be found dead. Thus it was made clear from these facts, to which I could add many more, that alcohol reduces the animal warmth.

ALCOHOL AND ANIMAL STRENGTH.

Then I came to another point. What is the effect of alcohol upon the strength of the body?

When a man takes alcohol he often feels his heart beat rapidly. Everybody almost is accustomed to speak of the thrill of the heart, and the throb of the heart from strong drink. I found the increase in the beat of the heart was very great. I discovered that two ounces, four table-spoonfuls of alcohol taken with water, would increase the strokes of the heart of a man several thousand times in twenty-four hours. Dr. Parkes found that eight ounces would quicken it 25,000 times in twenty-four hours. The heart beats about 100,000 times in a day, and here is an addition of 25,000 beats if the quantity of alcohol is carried up to eight ounces. That amount of extra work done by the heart is equal to lifting twenty-two tons weight one

foot from the earth. I need not stay to show further what a strain is put on the heart by strong drink.

I next passed on to try the effect of the same agent on those engines of flesh under the skin which, when we bid them, move the body. I mean the muscles. We have very fine instruments by which we can gauge accurately the power of the muscles, and by their use I learned this invariable fact, that the muscular power is reduced by strong drink. When you see a man drinking wine or spirit, he takes it for a little while, and then begins to talk with slight indecision. If he tries to look earnest, his lip quivers somewhat, and you wonder what he is going to say next. You notice also that the motions of his hands are not precise. There is a little tremulousness. By and by, if he continue to drink, you see another stage reached, when he does not grasp things at all well or cleverly. He gets maudlin and sentimental, he describes all sorts of grievances, thinks he is a martyr, or tells you something which he ought to have kept to himself. He is unsteady in his lips and unsteady on his legs, and if he has to make a speech, he pours out another glass, with the idea that it is going to help him out of his difficulty. Lastly, his muscular power ceases, and he sinks down, dead drunk, perhaps, under the table, with all the muscles of his body that should be under his own control, completely powerless.

I found that in all these stages of what is called alcoholic intoxication there is a steadily decreasing muscular power from the first. If a man is going to lift a weight or wield something, or carry something, or strike something, and he takes a glass of wine or spirit, thinking that it is going to assist him, you will see, if you watch him, that when it comes to the actual measure of power, he is only muddled and troubled. That first small quantity

reduces the muscular power; and the most careful research, all through the various stages of intoxication from drink, shows that the muscular power declines until that complete prostration called dead drunkenness ensues.

I found finally with what great rapidity and certainty disease from alcohol could be produced. You have heard of astronomers who can calculate eclipses with the greatest accuracy, and who can tell you to a certainty when the sun or moon will begin to be obscured, and when it will be illumined again. Well, I could tell you with almost corresponding accuracy what changes will take place in animal organizations from alcohol, because the order of change from the natural to the diseased is very regularly developed when alcohol begins its fatal work. That fact first led me to ask myself the question,—What is the use of any man submitting to the risk of these changes? Of what service are these changes to me? What good do they do? Why should I endanger my life by subjecting myself to them? If they were produced by any other agent, I should not submit to them. Why, then, should I trifle with strong drink? So I experimented upon myself, and as I found I worked better, and had better health without it, I left it off altogether, and became a total abstainer.

QUESTIONS.

- | | |
|---|--|
| 1. What is the natural degree of warmth or temperature of the human body?
2. How does the taking of alcohol affect the animal warmth?
3. What dangers are present when the action of cold is combined with that of alcohol? | 4. How does alcohol affect the heart?
5. How many more beats per day does the heart make after a person has taken eight ounces of alcohol?
6. How many foot tons of extra work is done by the heart?
7. What is the action of alcohol on the muscular powers? |
|---|--|

“Neither wine, spirit, nor malt liquor is necessary for health. The healthiest army I ever served with, exposed to all the hardships of Kaffir warfare, in wet and inclement weather, without tents and shelter of any kind, had not a single drop of any of them.”—*Inspector-General Sir John Hall.*

V.—RECEPTION OF ALCOHOL BY THE BODY.

Ab-sorb'ed, imbibed, taken up.
Be-numb'ed, deprived of sensation.

Con-firm'ed, fixed, established.

Cor-rode', to eat away, to impair.

Do-mes'tic, living in or near the abode of man.

Dose, a portion taken at once.

Ev'i-dence, that which makes clear; proof.

Ex-pan'sion, enlargement of surface.

Fa-mil'iar, well understood.

Glow, redness of body with sense of heat.

Im-per-cep'ti-bly, without perception.

In-ha'led, taken in by breathing.

In-tox-i-ca'tion, drunkenness, poisoning by things that cause insensibility.

Nar-cot'ism, stupor caused by a drug or poison.

Nox'ious, productive of injury.

Sens-a'tion, perception by the feeling or senses.

Se'ri-es, set, regular order.

Spe'cial, particuilar, peculiar.

Sus-cep'ti-ble, sensitive, impressionable.

MOST persons who are in the habit of taking alcohol in one form or other in their daily drink, will, after they have read such a Lesson as you last read, ask—If alcohol does not warm the body, if it does not give strength, what is the meaning of all those effects which we feel when we have partaken of it?

The answer to such an inquiry, which is at once very proper and very natural, is, that alcohol taken into the body to produce an effect that is felt, does, in truth, a great deal too much, and always more than ever ought to be done.

What does it do?

When any man, woman, or child, or, I may add, any domestic animal, receives into its body this spirit of wine, it is subjected very quickly to a certain series of changes which are of marked character. These changes vary as the dose or quantity of alcohol varies, but they are special in respect to themselves. In this way alcoholic drinks differ from foods and drinks that are strictly natural, and I would like you particularly to keep this truth always in your mind. If when you are hungry

or thirsty you take natural food or drink to refresh and recruit yourselves, if, for example, you take milk, you feel, after a little time, refreshed and restored. The restored power comes on, as we may say, imperceptibly. You are not made aware of it by a number of new feelings and sensations which excite and oppress you. But if, when you are weak from want of food, you take an alcoholic drink, though it may seem to rally you, it excites you. It flushes your face, it makes you feel aglow, it makes your head ache, and it makes the vessels in your temples throb. In a little time it causes you to feel lower than you were before, and you still want food, if you were hungry. I am supposing now that you only took a small quantity of the strong drink. If you took a large quantity, the effects would be a great deal worse.

There cannot be a doubt from these and other facts that alcohol does much to the body after it is taken into it, and I may tell you at once that what it does is so regular that you may calculate the effects by comparing the weight of the alcohol taken by the weight of the animal that takes it, unless the animal has, from long practice, got used to it. The quantity required to produce decided effects is, I have found thirty grains of the fluid to the pound weight of the animal. Thus a man who was not accustomed to take alcohol, and who weighed ten stones, or one hundred and forty pounds, would be brought into a state of narcotism and intoxication by four thousand two hundred grains, that is, eight ounces and six drachms of alcohol. He would be affected by a sixth part of that quantity, and would be made ill by half the quantity. He would be fully affected by the whole if, diluted with water, it were taken at one time. A man I once knew did take nearly this quantity in the form of brandy. Brandy is half water and

half alcohol, and this unfortunate man, not being aware of what he was doing, took quickly, one after another, five three ounce glasses of brandy mixed with water. In half-an-hour he was quite insensible, and if the doctor who was called to him had not been at hand to apply prompt remedies, death would probably have been the result of this rash experiment with so dangerous a poison.

Alcohol being soluble in water will enter the body very readily if it be taken into the stomach diluted with water. Were any one to try to take it in its pure or neat state, it would not be absorbed. It would act directly like a substance that corrodes the mouth and stomach; it would injure those parts, and it might kill directly by the mischief so done. It is, therefore, always diluted with water before it is taken, and in the strongest drinks containing it there is a large quantity of water.

In a hundred pints of beer, there are from ninety to ninety-five pints of water.

In a hundred pints of ordinary sherry wine, there are from seventy-five to eighty of water.

In a hundred pints of ordinary port wine, there are from seventy-five to eighty of water.

In a hundred pints of claret, there are from eighty-five to ninety of water.

In a hundred pints of champagne, there are from eighty-eight to ninety of water.

In the spirits there is less water.

In strong brandy, called, ironically, "the best," there are fifty pints of water to the hundred.

In whisky, there are fifty-two to fifty-eight pints of water to the hundred.

In gin, there are sixty to sixty-five pints of water to the hundred.

In rum, there are fifty-two pints of water to the hundred.

In taking spirits it is customary to add more water, so as to bring the drink nearer to the state of wine, and few

people can take brandy, whisky, gin, or rum, until they have mixed the liquor with three or four times its measure of water. I remember well that when I first tasted whisky,—on board a steamer called the *Orion*, which once plied between Liverpool and Glasgow,—although the whisky was diluted with water, it burned my mouth and throat so severely I was about to throw it into the sea, and should have done so, but that one of the sailors, a hard drinker, begged it, and to my wonder drank it off. I marvelled how he could live after such a burning draught, and I heard afterwards that he did not live long. Whenever a man has got to the length of being able, by practice, to drink strong spirit, his days are numbered. I learned that fact from seeing the effect of alcohol while yet I was a student of medicine, and alas! I have been obliged often since to see it confirmed.

Alcohol diluted with water will, then, enter the body quickly after it has been swallowed, and it seems to be taken up directly into the blood by the veins, which are the vessels for conveying the blood to the heart. From the heart it is carried with the blood over the lungs, and from the lungs, some of it being thrown off there by the breath, it returns to the heart with the bright red arterial blood. With that blood it is carried over the body to all parts, to the muscles, to the brain, to the spinal cord and nerves, and indeed to every organ.

DOES ALCOHOL BURN IN THE BODY?

Foods and drinks, such as milk, soup, gruel, fruit, vegetables, and animal flesh, are digested after they get into the stomach, and are prepared to be received into the blood and applied to the wants of the body. Alcohol is not digested, but is taken up direct into the blood, and

is distributed by the blood through all the structures of the body.

Making its way through the body with the blood, alcohol works its effects. The blood is the carrier of all that will feed and nourish the tissues. It carries albuminous foods for the building up of the muscles; it carries fat and other substances that are to be burned; it carries the salts that are to make the skeleton; it carries water, which is essential to every part; and it carries alcohol when that is supplied.

But alcohol cannot make any structure. It cannot make muscle, nerve, bone, skin, or any organ. It cannot play the part of water.

Can it be burned?

The great question as to the value of alcohol, whether it is or is not a food, is involved in this one question—Can it be burned?

Fat is burned in the body, and makes bodily warmth. Starch and sugar are burned in the body, and make bodily warmth. Can alcohol, like these substances, be burned? Alcohol resembles these substances in many ways. It contains the same elements, carbon, hydrogen, oxygen. Like oil, it can be made to burn outside the body. It burns in the spirit lamp. If it burns in the body, then, it too helps to make the body warm, and ought to be called a food. It may not, under such circumstances, be a good food. It may be a very bad food. The evil it does in other ways may be greater than any good it can do as a food. It may be very wrong to take it as a food when there are other foods of the warmth-producing kind that are cheaper and better. Still, if it produces warmth, it is a food, and no argument in the world can upset that as a fact, be it for good or for evil.

Let us, then, look at the evidence bearing on this all-important question. Does alcohol burn in the body, and produce animal warmth?

People after they have taken alcohol say they feel warm. They tell you they feel a glow which goes to the very tips of the fingers and toes; and "surely," they add, this is being warmed. I am not surprised that they should say so. I said so scores of times until I knew better.

There is no other evidence that alcohol causes warmth except this sensation; and if you think of the value of this evidence, you will see it is not worth much. It is no proof at all that alcohol is keeping up the animal fire. If I put some mustard on my skin with water, the place where the mustard is applied soon becomes very red and hot; and if I take a mustard bath, that is a bath in which mustard is mixed with the water, the whole surface of my body feels to be burning and in a glow. This, however, is no proof that the mustard is keeping up the animal warmth in my body.

There is a still better view of this matter, founded on personal experience, which, I feel sure, must be quite familiar to you and to everybody who has lived where there is snow. When snow is on the ground, and you go out into it and make it into snowballs, you find, unless you keep up brisk exercise, or unless you cover your hands in warm gloves, that your hands get excessively cold and benumbed. You feel this as long as you are in the snow; but when you take your hands out of the snow and let them "come round," as boys are accustomed to say, then your hands soon become burning hot, so hot that they ache to the very bones. You "beat the booby" in order to get relief, and you say you have got "hot-ache" from the cold.

It is quite certain that in this well-known experience

the glow does not come from any process of burning or production of heat in the body as the result of anything taken into the body that will burn.

There is yet another view bearing on this matter, and based or resting on everyday experience.

If you are a modest and good scholar, and your teacher, always anxious to help you on, says to you, perhaps when you did not expect such good news, "You have done that lesson remarkably well," you get very red in the face, you feel warm, and your ears tingle. Your face for the moment really is warmer than it was before. Why? Ah, there's the rub! It was not made warmer because you had taken something that was circulating in the blood, and was, by the process of burning, increasing the animal fire. No! You were warmer, under all the circumstances named, owing to an effect made on the circulation of your blood as it flowed in its course. In the heated parts more blood was made to flow for the time. The blood was warm throughout the whole of its mass, and when more of it came up to the surface to be diffused there, the part was really warmer. If you tried it with a delicate thermometer, which measures the warmth of the body, it would be found warmer where it looked in a glow, as compared with other parts where there was no such glow. It feels warmer there also because the delicate nerves, susceptible to the most refined impressions of heat and cold, convey the impression of warmth up to your brain, and cause you to experience the glow.

It is, as I believe, in this self-same manner that alcohol acts when it causes the body to feel warm, and the tips of the fingers and toes to tingle. In this respect, in this power of making the blood come to the outer surfaces of the body and in causing a sense of glow or warmth, without

making any additional warmth, alcohol does not stand alone. There are many chemical substances which do the same, and which, if you took them to eat or to drink, or if you inhaled them, as vapours, by your breathing, would produce the same results. How these agents, presumably, act, must be left for explanation in another Lesson.

QUESTIONS.

1. What is the difference of effect between natural foods or drinks and strong drink?

2. What is the immediate effect of strong drink when the body is exhausted?

3. What is the after effect?

4. What weight of alcohol in proportion to the weight of the body will produce a decided effect?

5. What is the effect of swallowing undiluted or neat spirit?

6. How many pints of water are there in a hundred pints of beer, sherry, port, claret, champagne, brandy, whisky, gin, and rum?

7. When spirit diluted with water is taken into the stomach, where does it go, and how and where is it carried into the body?

8. How does it differ in these respects from natural foods and drinks?

9. In what respects does alcohol resemble those foods that are burned in the body?

10. How may the body be made to feel warmer than is natural without the action of foods that produce animal warmth, and what relation have these actions to the action of alcohol?

“I was twenty years older than any of the officers or crew, and thirty years older than all excepting three, yet I could stand the cold and endure the fatigue better than any of them who made use of tobacco and spirits. I entirely abstained from these. The most irresistible proof of the value of abstinence from spirituous liquors was, when we abandoned our ships we were obliged to leave behind us *all* our wine and spirits because we could not carry any of our heavy loaded sledges, which we had to drag 900 miles before we got to Fury Beach. There, indeed, we found provisions, but, thank God, *no spirit*, and it was remarkable to observe how much stronger and more able the men were to do their work when they had nothing but water to drink.”—*Sir John Ross*.

VI.—ACTION OF ALCOHOL.

Con-tract'ing, closing, as in closure of the hand.

Di-la'ting, opening, expanding.

Dis-ten'sion, enlargement from within.

In-dis-crim'in-ate-ly, without selection.

Ir'ri-ta-ble, painful, sharp.

In-vol'un-tar-y, without the will.

Lo'cal-ly, in the one part.

Mech'an-ism, working parts.

Nu-tri'tion, building up of new structure in the body.

Per'man-ent-ly, fixedly.

Ret'i-na, the nervous screen at the back of the eyeball.

Ter'min-als, endings.

Ul-cer-a'ted, destroyed, as if eaten away.

Vol'un-ta-ry, by direction of the will, free, willing.

I PROMISED in the last Lesson to explain how alcohol acts on the body to produce the glow and warmth of surface which we know it does produce soon after it has been taken. We saw that there were several ways of producing this glow, as by anything which stimulates the skin when applied to it, like mustard ; or by cold ; or by an emotion which causes one to blush and feel red. I can tell you now of a still better experiment. If you take a few drops of pure alcohol, and place them by means of a bit of white clean blotting paper on the skin of your arm, covered over closely so that the alcohol cannot evaporate, and let the alcohol remain, so applied, for a few minutes, you will feel a slight tingling sensation, and when you remove the paper you will discover the part over which it has lain showing a faint blush of red, which will last a short time, and then pass away, leaving for a while a shade of whiteness behind. Here the alcohol itself has done some thing locally which is very distinctive. It has produced a glow.

When men take into their stomachs any quantity of alcohol sufficient to give a sensation of warmth, and some say of pleasure, they do the same thing. They make the surface of the stomach red and extra warm, and they feel the warmth. Numbers of foolish persons actually take

alcohol in order to produce this warmth, and continue the process until the surface of the stomach, which is a most delicate surface, the same kind of structure, in fact, as the membrane which covers the lips, becomes constantly red or inflamed, and sometimes ulcerated and permanently injured. If you were to see a person putting alcohol on his skin every day, in the same place, until he made the place permanently red, irritable, and sore, you would think, what a foolish man he was. You would say that such a man could hardly be in his senses. Yet hundreds of thousands of men do this to the stomach, the least injury to which spoils it for doing its proper work in digesting the food that is to make new blood and from the new blood new parts and organs of the body.

If you see a number of persons dining together and taking wine or other strong drink, you observe after a while that they talk louder and faster than they did before, and are altogether more noisy and boisterous. If you look at them you see that the colour of their skin has also much changed. They are redder in the face and hands than they were, and they are, in fact, all in a glow. They are red, and the surface of their body is in the same condition as a bit of the surface would be if alcohol were applied to it by the blotting paper.

Should you see these same persons a little later on, you would notice that a change of a marked character had taken place. They would look pale, and instead of feeling the glow they felt when the drink began to act, they would feel and would be cold, colder than they ought to be if they were in a truly natural condition.

But what you would then see would be little to what might be seen if all the structures of these persons were open to your view. The skin is one organ alone out of

all that are affected. The outer surface of the eyes, and the delicate screen that lies at the back of each eye to receive the impressions of sight, the retina, become redder as well as the skin. The surface of the brain is reddened and injected. The spinal cord, which runs from the brain in the opening or cavity of the spine, and from which the nerves come out to pass to the different portions of the body, is injected. The lungs are red and injected. The throat, the stomach, the intestines, the great organs like the spleen or milt, the liver, and the kidneys, are all in the same state in the first stage of the action of alcohol. They are all too full of blood and in a glow. Afterwards they are all too empty of blood, and are below their natural warmth.

I once in my life had the sad but singular opportunity of seeing the brain of a man who was killed while he was in the first or acute degree or stage of alcoholic poisoning. His brain on the surface, which in the natural state would have been of creamy paleness, was glowing red. It was of the colour of bright red velvet, and its vessels were full of blood to distension.

It is no wonder, under such circumstances as these, that the body should feel warm, and that the fingers and toes should tingle. It is as if there were indeed a fire in the body, but the fire that is felt is not a fire that is due to fuel supplied to the animal fire and slowly burning. If it were so, the action would be much more prolonged, and the effects would be different and even more serious than they are. What has really happened I will try to explain in a few simple words.

The great blood-vessels or arteries which carry the blood from the heart to all parts of the body, in order to feed and vitalise them, end at last in exceedingly fine

branches, the terminals of the arteries, from which, in continuation, the veins or vessels that are to carry back the blood to the heart, commence. In these small arteries, which I may call the minute circulation, and which is, indeed, a wonderful network of infinitely small vessels, the most important changes of life are carried on.

Through this fine webwork the fluids pass which leave the blood to form the organs of the body. From this fine webwork the substances that have been used up in the body pass out to be removed away. In this fine webwork the air, or rather the oxygen of the air, which the blood brings from the lungs, combines with the fuel of the body, and here, therefore, the animal fire or furnace is working.

For health to be maintained, however, in all parts, which means, of course, the maintenance of health in the body altogether, it is essential that the progress of the work should be regulated, so that it may be almost as steady as the action of a time-piece. The mainspring of all this work, which is the beating heart, must be correctly regulated like the mainspring of a clock, and this regulation is provided by nature in the most beautiful and simple manner.

Those small vessels are not merely elastic hair-like tubes, which open to let the blood through them and close when the blood has passed so as to allow the heart to throw into them its blood indiscriminately. They are better arranged. It is necessary that the vessels should be so regulated that the quantity of blood passing through them should be according to requirement. A great physician, Sir Thomas Watson, has compared this process to the mode of regulating the supply of gas. The pressure at the gas main is the chief source of supply, and is always on; but in our rooms we have taps, and as we want the

light or the heat, or both, we turn the taps on or off, and so supply the gas according to our wants or necessities.

In our bodies there is the same kind of regulation, only we are not conscious of it. The heart, like the gas main, is at all times giving us the grand supply. The little vessels are receiving the blood and regulating the supply as if they were a million or a million of millions of self-acting taps, of the action of which we have no knowledge when we are in health and everything is quite natural.

The heart and minute arteries are contracting, dilating muscular organs, whose motions are controlled by the nerves, from nervous centres or points in the central portions of the body.

We are endowed with two sets of nerves. One set have for their duty to direct the muscles which move in obedience to the will. These we call the voluntary muscles. The muscles of the arms and legs are of this class. The other set have for their function to direct those acts which are not under the control of the will, but which go on whether we will or not. These we call the involuntary muscles. The heart is a muscle of this kind. The muscles which make the stomach churn the food are of this kind. The fine muscles of the arteries, and those finest muscles of the minute circulation are also of this kind.

Wait for one moment to note how wisely this plan is ordained. If there is some act which it were best that we should do of our own will and desire, we have the mechanism for the work. If there is something to be done which should be independent of us, something that must go on in order to maintain our life whether we are asleep or awake, whether we are thinking about it or not, there is also the mechanism for the work. The heart must go on ; diges-

tion must go on; the regulation of the blood in the minute circulation must go on without our knowing it, and it does. It is very good indeed that this is the case. If it were not, there would be few games that boys or girls could play at, for when they were playing they would forget all about keeping their hearts and other self-acting organs going, and down they would drop, and faint or die.

This self-regulation is always going on in our bodies in respect to the work of the heart, the work of the blood vessels, the distribution of blood, the nutrition and building up of the tissues, the development of the animal warmth and the serving out of it. If everything be fair and equal, all is well. If the right quantity of blood is given up to every part, all is well: the warmth is right, the colour is right, the nutrition is right. If the quantity of blood be increased, something is wrong: the warmth is increased, so that heat is felt; the colour is heightened; the nutrition is or may be quickened. If the quantity of blood be reduced below what is natural, something again is wrong; the warmth is less, so that coldness is felt; the colour fades to paleness or whiteness; the nutrition is less active. When a person is flushed with wine, he is in the first of these conditions; when he is pale and chilled, or after he has taken an excess of wine, he is in the second condition.

ACTION OF ALCOHOL.

Now for the explanation of the action of alcohol. It is one of the properties of alcohol so to act on the nervous system as to check the controlling nervous power that regulates both the voluntary and the involuntary nervous systems. If you have ever witnessed the unhappy spectacle of a man helplessly drunk, you know that he has lost volun-

tary power. The common saying, "helplessly drunk," expresses that fact. He has lost the power of directing his own movements, and of regulating them. He has lost the power of resistance. But long before he lost that voluntary control, the involuntary was lost. The resistance of those fine involuntary muscles was broken soon after the taking of the strong drink commenced, and the governing power was shown to be disturbed as soon as ever the redness in the face and other parts was indicated. The heart, uncontrolled, like a mainspring of a clock when the pendulum is made shorter, was then pouring an increased and imperfectly regulated volume of blood into the fine vessels, rendering them distended and enfeebled. The natural result was that a glow was felt, and that the surfaces of the body were for the time warmed and reddened.

Mark, however, what follows. This seeming warming was actually a process of cooling. So much blood brought to the surface, unless the air be very warm indeed, is robbed of warmth by exposure, and returns to the heart, by the veins, chilled. In the next stages of change, therefore, from the action of alcohol, the heart would beat feebler; the whole temperature of the body be made colder; and the surfaces of the body would be not merely cold, but pale as well as cold, and would not, for many hours, make up the natural heat again.

In the long run, therefore, the effect of alcohol is to chill and cool the body, and that is the reason why alcohol is so dangerous in combination with cold.

If we look at the effects of alcohol throughout the whole of its action, from the effects of a small quantity, which merely causes a flush of the face and a little after coldness, to the effects of a larger dose, or a number of small doses quickly repeated one after the other, we discover that this

active agent brings on, in those under its influence, the following four distinct degrees or stages:—

1. A first stage, in which the involuntary muscles which regulate the flow of blood through the minute circulation are weakened; in which the flood-gates of the circulation being opened, all the organs of the body are flushed with blood; in which the temperature or warmth of the body is raised, the heart is quickened in action, the breathing is quickened, and the mind is excited.

2. The action of alcohol being continued, there is the second stage, in which the muscles directed by the will become slightly affected, and the mind is more excited and irregular in its action; the heart is still quickened, but less powerful; the body is still a little too warm, but the warmth is falling; the flush of the skin is passing away or changing into a darker hue.

3. In the third stage, the action of the poison being still persisted in, the condition greatly changes. All the voluntary muscles lose their self-control and are losing their power. The body is cooling, and is either very pale and cold, or dark-leadened coloured and cold. The action of the heart is becoming feeble. The breathing is heavy, noisy, and irregular. The limbs are tremulous, and the gait unsteady, or even impossible. The mind is violent, maudlin, or quite incapable. The clear reason is gone.

4. In the fourth or last stage the destruction of muscular and nervous power is all but complete. The body lies helpless and insensible; the surface of the body is either pale or dark; the vital warmth is reduced three, four, or even five degrees; the limbs are at times convulsed; the eyes are fixed. Nothing, in fact, remains to indicate that the person still lives, except that the heart is feebly beating, and the breathing, very slow, is just working suffi-

ciently to keep up the flickering life. This is the stage of "dead drunkenness." If men in this awful state had the power to take a little more of their poison, there would be a fifth stage, and that would be *Death*.

Through all these passing changes the expression of the face and the attitude vary in the most remarkable manner, becoming all through more animal and less human. If a man could only see himself during these changes as others see him, he would be shocked even at himself, while a woman would loathe herself because she is so debased. All through the stages, moreover, the mind is, in like manner, disturbed and dangerous—dangerous to the person influenced, too often wild and dangerous to all around.

QUESTIONS.

1. What is the effect of applying alcohol to the skin?

2. What is the action of alcohol on the surface of the stomach?

3. What is the effect of alcohol, soon after it is taken, on all the organs of the body?

4. How does it at first affect the warmth of the body?

5. What do you mean by the minute circulation of blood, and what takes place in it?

6. What two classes of muscles are there in the body?

7. What is the action of nerves on these muscles?

8. What is the action of alcohol on the nerves, and through them on the muscles?

9. Why does alcohol, which seems to warm the body, really cool it?

10. Alcohol carried to its full degree of action, short of death, causes the person under its influence to pass through a series of changes that can be divided into stages or degrees of intoxication. How many stages, or degrees, are there?

11. Give an account of all these stages.

12. In the fourth stage why does the affected person continue to live?

"Soon as the potion works, their human count'nance,
The express resemblance of the gods, is chang'd
Into some brutish form of wolf or bear,
Or ounce, or tiger, hog, or bearded goat.
And they, so perfect is their misery,
Not once perceive their foul disfigurement,
But boast themselves more comely than before."—*Milton*.

"He that is drunken
Is outlawed by himself. All kinds of ill
Did with his liquor slide into his veins.
The drunkard forfeits man: and doth divest
All worldly right: save what he have by beast."—*Herbert*.

PART III.

I.—REASONS FOR ABSTINENCE.

Com-pu'ted , counted, calculated.	Per-di'tion , destruction, ruin.
Con-cat-e-na'tion , linking together.	Phil-an'tro-py , benevolent work or action.
Di-et-et'ic , pertaining to diet.	Po-ta'tion , a draught, a drink.
Dis-crim'in-at-ing , selecting wisely.	Prov'i-dent , saving.
Es'tim-ate , calculation.	Rem-i-nis'cen-ces , recollections.
Ex-ac'ti-tude , precision, correctness.	Sal'vo , an exception, an excuse.
Gas-hold'er , a vessel for holding gases.	Se-cre'tions , fluids formed in the body.
In-su'r'er , one who insures his life or property.	Se-date'ly , quietly, orderly.
Mean , average.	Sed'en-tar-y , accustomed to sit much.
	Sus-cep'ti-ble , liable to.
	Subt'le , keen, deep, cunning.

DIRECTLY the least appreciable influence from alcohol is felt, the minute blood vessels that let the blood pass through them into the extreme parts of the body are, as we know, reduced in power, so that they fill with blood. The face gets flushed; the brain gets flushed; the lungs get flushed; the breathing becomes quick, and the heart increases in its beating several strokes a minute.

I might tell you much more of what would be done by larger quantities of alcohol, in which even moderate drinkers indulge, but I keep to the description of a small quantity, because I wish here to refer only to the smallest that possibly can do what is commonly called "good." All who advocate the moderate use of strong drink, all who apologise for the use of it, would tell you that they would not recommend any person whatever to use it beyond the amount that produces moderate effects, the effects that would be caused by taking what the late Dr. Parkes calls the dietetic dose: the effects, for example,

that would follow after taking per day three or four tumblers of beer, or half a pint to a pint of French wine, or three or four wine-glassfuls of sherry or port, or one wine-glassful of brandy, rum, whisky, or gin. Moderate drinkers plead for enough alcohol to produce the first effects. They ask for no more. They admit that if more be taken some worse effects will follow. But for a gentle stimulation, a mild warming-up, surely they may be granted this salvo.

This is the knotty point of points. There is not a sane man or woman in the world who has any knowledge on the subject at all, who would plead for the habitual use of alcohol beyond the first stage of its action. To carry it a stage further so as to get into confusion of thought, with failure of lip, angry passion, thickness of speech, headache, nausea, a little too free communication of sentiment, or conversation rather too fast to be perfectly cool in expression, would be passing into the second degree of alcoholic influence. Not to put too fine a point on it, this would be an approach to what is called elevation, moral or physical, I cannot say which, but elevation of some kind, which would be decidedly wrong.

A man or woman sitting down, or standing up, if you like, to drink wine or other stimulant, always starts, nevertheless, on the way that leads through those four stages we know of towards an easy realisable destination. Stage one, is that gentle stimulation called moderate excitement or support. Stage two, is elevation, whatever that may mean,—it is not elevation of character, of that I am satisfied. Stage three, is confusion of mind, action, and deed, with sad want of elevation. Stage four, is complete concatenation of circumstances, with the stages perfectly matured, the journey completed, and the traveller

lying down, absolutely prostrated in mind and body—a human being dead drunk and incapable.

I repeat,—whenever a person begins to take any portion of alcohol, he starts on that journey. The knotty question, then, is this. Ought a person to start on that remarkable journey at all? Should he try any stage of it? Every one says:—"Do not venture on the last three stages on any account." But some say "live and go happy, day by day, through the first walk or first fourth of the way, and you will be the better for it; it is a nice exercise; it makes your heart light; it refreshes your mind; it quickens your secretions; it assists your digestion. The wisest men of all ages have," they declare, "daily walked this stage on the alcoholic highway."

This is very seductive language, but I warn every one from being tempted by it, and from taking a step on that highway. It is the devil's highway! It is the grand model of his engineering skill. It is wide, it is open, it is straight, it is smooth, it is filled with "jolly companions every one," it is fenced with pleasures, it is rich in historical reminiscences. But there is this peculiarity about it, that there is not an inch of it, not a hair's-breadth of it, safe. Therefore keep off it altogether.

To anyone of sound health who takes strong drink I would say:—If you are in a first-rate condition of body, if you can throw off freely causes of oppression and depression, if you are actively engaged in the open air, if you have nothing to do that requires great exactitude or precision of work, if you are not subjected to any worry of mind or mental strain, if you sleep well, if you are properly clothed and are not exposed to excesses of heat or cold, if your appetite is good and you can get plenty of wholesome food, if you are favoured with all these advantages,

then you may indulge in a moderate potation of wine, beer, or spirit. You are strong enough to bear the infliction, and may, without any great risk, enjoy it. But these favourable conditions are all necessary. If you are limited with respect to exercise, if you are of sedentary habits, if you are much worn or reduced in mind, body, or estate, then that small amount of alcohol is adding to all your troubles, and you will give it up if you are wise.

I would say to those who will have the luxury, have it with the perfect understanding that it is a luxury. Positively, solemnly, it is never a necessity; and if the expression of truth be absolutely stated, every one is better and safer without even the most moderate indulgence. So, to you, young people, I would say with all the earnestness I feel, never learn the indulgence, never touch the treacherous poison, strong drink. You will then never know what it is to want it, nor what it is to have to give it up.

WHAT IS THE DANGER?

The danger is that attaching to all luxuries—that they, being unnecessary, are apt, first, to lapse into self-imposed necessities, next, to become tyrants and bad masters, setting up bad examples, by which many who are unfortunate, and many, even among the easy and luxurious, fall.

A learned man, a man of sciencé, has, however, bidden us ignore this bad effect of example. It betrays, he thinks, weakness and want of knowledge. If there be a number of weak creatures, male and female, who, by first following moderate example, are led to go farther than that example, and who fall into perdition, let them fall. That is their look-out, and exemplars are faultless. Stint your own enjoyment to save another from drink! As well

take your warm overcoat off your own back to save a beggar from death by cold.

Stop! I answer, not quite so fast there.

Ages ago it was said by one of the wisest of men: "Be not deceived; God is not mocked. Whatsoever a man soweth, that shall he also reap." What is meant by this sowing is, the casting into susceptible soil the smallest seed that will bring forth fruit. If you, by your example, sow evil, you and yours, in the purest physical and worldly sense, will reap evil. This is the order of nature, from sowing on to reaping; but there is another evil apart from such results as these.

When a luxurious man in his luxurious resolve has imposed a necessity upon himself, he has created a condition of body which, being unnatural, is calculated to feed upon the unnatural. In his own body as the susceptible field he has sown an evil, and in it he will reap the harvest. So will you if you follow his course. You will have set up within yourselves a desire which nothing but the most zealous exercise of your discriminating and resolute will can meet and keep under subjection. You must, therefore, be ever on guard. Trespass but little on your resolution and your false desire will gain power with the most perplexing decision. In this way some of the very strongest and best of men have been tried and overcome.

One of these, whose illustrious name is the boast of this country, gives us his own confession word for word. Sir Humphrey Davy, the great man who first discovered the miners' safety lamp, and, by experiments on himself, the effects of inhaling laughing gas, is here our witness.

No one can accuse Davy of want of will, or skill, or knowledge, or goodness. But he made it a habit, gradu-

ally acquired, to inhale the intoxicating laughing gas, until at last he declared that he could not look at a gas-holder, could not even watch a person breathing without experiencing an all but irresistible desire to indulge in this form of intoxication. Who are we, then, who can resist these subtle influences from intoxicating agents? How do we know that we are powerful enough to oppose a self-inflicted necessity? There was no one who ever lapsed into danger who did not begin little by little to learn, to desire, and afterwards to feed desire. Wisely, sedately, without the least feeling, I warn the young not to create desire; then they can never be betrayed by it.

To the warning I would add this cautious instruction. It may be true that men who are favourably placed seem to escape injury from the moderate use of strong drink. Still, on this point, a word of explanation is demanded. Those who are moderate drinkers live shorter lives than those who abstain altogether. I could show you a nine years' calculation of a provident institution, in which there were two classes of insurers, one class which drank moderately, another which abstained altogether. In the section including those who were moderate drinkers, two thousand and two deaths were expected to occur, and one thousand nine hundred and seventy-seven deaths actually did occur, or twenty-five less than the expected number. In the abstaining section one thousand one hundred and ten deaths were, by the same mode of calculation, expected to occur, but actually only eight hundred and one deaths did occur, or three hundred and nine less than the expected number.

Listen to another set of truths.

If a man becomes intemperate at twenty years of age, he will only live fifteen and a-half years instead of forty-four years. If a man becomes intemperate at thirty years of

age, he will only live thirteen and a-half years instead of thirty-six years.

Amongst publicans, who are engaged in the sale of intoxicating liquors, the temptation to intemperance tells with such force that one hundred and thirty-eight of these men die in proportion to a mean of one hundred following seventy other trades or occupations.

Out of nine hundred inquests held yearly by Dr. Lankester, the late coroner for Central Middlesex, on persons who died violent deaths, deaths requiring an inquest, four hundred and fifty, or one-half, were due, directly or indirectly, to the effects of strong drink.

In England, in the year 1876, as many as one thousand one hundred and twenty deaths were directly recorded against drink; while the deaths, direct and indirect, due each year, to the same cause, have been recently calculated by Dr. Norman Kerr and Dr. Morton, to amount to fourteen thousand seven hundred and ten wholly due, and to twenty-four thousand five hundred and seventy-seven partially due to alcohol. A total of thirty-nine thousand two hundred and eighty-seven deaths, on the lowest possible estimate, is thus attributable yearly, in England alone, to strong drink.

Lessons like these, containing many matters of fact as well as of suggestion, will, I hope, be likely to lead to one good practical result, to which I have before referred but cannot too often repeat. I trust they will induce those who have never yet tasted so bad and so seductive an agent as strong drink, never to begin to taste it. A liking that is once acquired for anything is so strong in many persons that it is a pain and difficulty to them to leave it off; and alcoholic drinks are so apt to create a liking for, and a feeling of dependence upon them, that they are

specially to be guarded against at the commencement of every boy's and girl's career in life.

I have met with many people who have learned to give up these drinks, and who have derived great good from giving them up. But I do not remember one who did not confess that the act was a trial, and who did not envy those most fortunate people who had never tasted such drinks and never understood the difficulty of leaving them off. My advice, therefore is: taste not the tempter; court not the difficulty.

QUESTIONS.

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| <p>1. What is usually considered to be a moderate daily quantity of alcoholic drinks?</p> <p>2. Why is even this quantity unsafe?</p> <p>3. What is the danger of becoming accustomed to such a moderate quantity?</p> <p>4. What evidence is there which shows that what is called moderate drinking is hurtful?</p> <p>5. In a provident institution where there were members who took alcohol, and other members who did not, what was the respective value of their lives?</p> <p>6. If a man becomes intemperate at twenty years of age, how many years will his life be shortened?</p> | <p>7. If a man becomes intemperate at thirty years of age, how many years will his life be shortened?</p> <p>8. How many deaths of publicans are there in proportion to a hundred deaths of persons following seventy other occupations?</p> <p>9. Out of nine hundred deaths by violence, how many were caused from taking strong drink?</p> <p>10. How many persons are computed to die in one year in England from the direct and indirect effects of strong drinks?</p> <p>11. What grand practical lesson for the young is conveyed in these facts?</p> |
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“Nor is it the sot's or drunkard's progress only that I delineate here. Great multitudes come to the same misery with the drunkard and the sot, without ever numbering wine among the pleasures of existence, and who have always filled their glass scantily in involuntary imitation of, or reluctant complianee with, their associates.

To pine in an uncertain comfortless state before falling into a well-marked disease, is not less frequent than to linger on a sick-bed before being permitted to enter the asylum of the grave. The drinker of too much wine commonly finds himself, as some familiar writer terms it, ‘*I dont know howish,*’ for a long time before he is compelled to resort to the doctor. However trifling his daily allowance, let him not flatter himself with the idea that it is impossible what he feels can be owing to so small a quantity.”—*Dr. Beddoes.*

“Would you extend your narrow span,
And make the most of life you can—
Would you, when med'cines cannot save,
Descend with ease into the grave;

Calmly retire, like evening light,
 And cheerful bid the world good-night?
 Let temp'rance constantly preside;
 Your best physician, friend and guide!
 Would you to wisdom make pretence,
 Proud to be thought a man of sense?
 Let temp'rance, always friend to fame,
 With steady hand direct your aim;
 Or, like an archer in the dark,
 Your random shaft will miss the mark:
 For they who slight her golden rules
 In Wisdom's volume stand for fools."

—*Cotton.*

II.—THE BEGINNINGS OF THE EVIL

An-a'tom-ist , one skilled in a knowledge of the animal body.	Pass'ive , irresisting.
At'tri-bute , to give as due.	Per-sist'ent , continuing.
Con-dens'ed , made closer, compact.	Phys'ic-al , pertaining to nature.
Cre'na-ted , notched, indented.	Plas'tic , capable of being moulded.
Di-a-lyse' , to part asunder.	Sol-id-i-fi-ca'tion , making solid or compact.
Ha-bit'u-al-ly , eustomary; according to habit.	Sub-stan'tial-ly , solidly, firmly.
Lu'bri-ca-ted , made smooth or slippery; moistened.	Sus'ten-ance , food, that which supports life.
Me-chan'ic-al , pertaining to mechanics.	Tem'por-ar-y , transient, for a time only.

WE have read so much about the action of strong drink on the body, that we may now be considered to have some knowledge of the subject. It will, however, be useful to recall some of the leading truths, and to dwell for a few moments on them.

The well-proven fact that alcohol, when it is taken into the body, reduces the animal warmth, is full of the most important suggestions. The fact shows that alcohol does not in any sense act as a supplier of vital heat, as is so commonly supposed, and that it does not prevent the loss of heat as those imagine who "take just a drop to keep out the cold." It shows, on the contrary, that cold and alcohol in their effects on the body run closely

together, an opinion confirmed by the experience of those who live or travel in cold regions of the earth. Experiments with alcohol in extreme cold tell the like story; while the chilliness of body which succeeds upon even a moderate excess of alcoholic indulgence leads directly to the same indication of truth.

The conclusive evidence now in our possession that alcohol taken into the animal body sets free the heart, so as to cause an excess of motion, is proof that the heart, under the frequent influence of alcohol, must undergo serious changes of structure. It may, indeed, be admitted in proper fairness, that when the heart is passing through these rapid movements it is working under less pressure than when its movements are slow and natural; and this allowance must needs be made, or the inference would be that the organ ought to stop at once, by the excess of strain put upon it. At the same time, the excess of motion is injurious to the heart and to the body at large; it subjects the heart to irregularity of supply of blood; it subjects the body in all its parts to the same injurious influence; it weakens both the heart and the body.

When it is understood that what is called stimulation or excitement is, in fact, a relaxation, or weakening of one of the most important mechanisms in the animal body, the minute, resisting, compensating circulation, we detect quickly the common error in respect to the action of stimulants, and obtain a clear understanding of the well-known experience that all excitement, all passion leaves, after its departure, lowness of heart, depression of mind, sadness of spirit.

We learn, then, in respect to alcohol, that the temporary excitement it produces is at the expense of the animal force, and that the idea of it being necessary to resort to

it, that it may raise up the forces of the animal body into true and firm and even activity, or that it may add something useful to the living tissues is most incorrect.

Some people say that strong drink cheers the weary, that to take a little wine for the stomach's sake is good, and no doubt there are times in the life of man when the heart is oppressed, when the resistance to its motion is excessive, and when blood flows languidly to the centres of life. In these moments alcohol seems to cheer. It lets loose the heart from its oppression; it lets flow a brisker current of blood into the failing organs; it aids nutritive changes; and, altogether it *seems* to be of temporary service to man. So far alcohol may be good, and if its use could be limited to this one action, this one purpose, it would be amongst the most excellent of the gifts of science to mankind.

Unhappily, the habit of resorting to the use of it when it is not wanted as readily as when it is wanted, overbalances, in the multitude of men, any temporary value. Hence, alcohol becomes a dangerous friend even in the hands of the strong and wise; a poison in the hands of the foolish and weak. Used too frequently, used too excessively, it spoils vital organs; it makes the course of the circulation slow, imperfect, irregular; it suggests the call for more of itself; it tempts to renewal of the call, and ruins the health before the hour for ruin, by natural decay, should be at all near.

It is assumed by most persons that strong drink gives strength, and we hear feeble persons saying daily that they are being "kept up by stimulants." This means actually that they are being kept down; but the sensation they derive from the immediate action of the stimulant deceives them, and leaves them to attribute passing good to what, in the large majority of them, is persistent evil.

The evidence is, in fact, perfect that alcohol gives no power to brain or muscle. During the first stage of its action it may enable a wearied or a feeble body to do brisk work for a short time; it may make the mind briefly brilliant; it may excite muscle to quick action; but it does nothing efficiently, and, as it leads to destruction, it fills up nothing it has destroyed. A fire makes a brilliant sight but leaves a desolation. It is the same with strong drink.

Supposing it were true that alcohol does no more than cause a temporary derangement in the bodies of those who take it, there would, I think, be quite sufficient proof of injury to prevent all wise persons from partaking of it. But it does more than temporary mischief. It acts on the body in a number of permanent ways which are very serious and often fatal. We shall try to understand why this is the case.

HOW STRONG DRINK INJURES.

When the strong drink called alcohol is circulating through the blood, in sufficient quantity to induce its second or third stages or degrees of action, and when it circulates habitually in the blood, it exerts a peculiar physical effect not only on the minute structures of the organs of the body but on the blood itself. The small red corpuscles which float in the blood stream, and which are the bearers of the oxygen to the extreme parts, are rendered irregular in form. They shrink, and are notched in their margins, or, as is technically said, are crenated. In fact alcohol, owing to its greed for water, acts upon the blood corpuscles after the manner of a salt, making them shrink. The blood also absorbs oxygen with a reduced freedom, and, the harmonious combination of its parts

being thus disturbed, it builds up, imperfectly, the vital organs and structures.

In addition to the mischiefs inflicted by alcohol upon the blood, there are other structures spread out through the body, which undergo modification from this agent of evil. These structures are known as the membranes. There is a membranous envelope called the skin. Through the whole of the interior of the body, from the lips downwards, and through the passages of the lungs to their minutest branches, there is another envelope called the mucous membrane. The lungs, the heart, and other organs, are folded in delicate membranes, which we can strip from these parts. If we take a portion of bone, we find it easy to tear off from it a strong membranous sheath or covering. If we open or examine a joint, we find both the head and the socket of the bone lined with membrane.

All the muscles are enveloped in membranes. The brain is enveloped in three membranes. The eyeball is an instrument made up of fluids enveloped in membranes.

It was held by the old anatomists that this membranous arrangement of the body is merely mechanical. The parts and organs, according to their view, are supported and held in position, and are lubricated by fluids secreted by these membranous sheaths, pouches and coverings. The offices of mechanical support and lubrication are important, for it is true the membranes hold all the structures together in perfect order. But this is only a small part of their duties. The membranes are the filters of the body. In their absence there could be no building of structure, no solidification of tissue, no organic mechanism. Passive themselves, they, nevertheless, separate all structures into their respective positions and adaptations.

The body receives from the vegetable world and from

the earth the food and drink it requires for its sustenance and motion. It receives food for its muscles; combustible food for its motion; water for the solution of its various parts; salts for constructive and other purposes. These foods have to be arranged in the body, and they are arranged by means of the membranous envelopes. Through the membranes nothing can pass that is not for the time in a state of watery solution, like water itself. Water passes through them, and salts, in solution, pass through them. But constructive matter, of the character of flesh, does not pass; it is retained in them until it is chemically decomposed into a soluble form of matter.

When we take for our food a portion of animal fleshy matter it is resolved, in digestion, into a soluble fluid before it can be absorbed. In the blood it exists in the fluid condition. In the solids it is laid down within the membranes into new structure, and when it has played its part it is digested again, if I may so say, into a crystallisable soluble substance, ready to be carried away and replaced by addition of new fleshy substance. Finally, it is passed, in the soluble form, through the membranes into the blood.

Upon the membranes in their integrity, all the silent work of the building up of the body depends. If the flesh-making fluids of the blood escape through the membranes, the body dies; dies as if it were slowly bled to death. If, on the contrary, they become condensed, or thickened, they contract on the substance enclosed within them; they no longer properly sustain, they no longer prevent friction in the parts once lubricated by their secretion, and they no longer separate or dialyse. In old age we see the effects of modification of membrane naturally brought on; we see the fixed joint, the shrunken and feeble muscle,

the dimmed eye, the deaf ear, the enfeebled nervous function.

Upon all these membranous structures the alcohol of strong drink exerts a direct and bad action. It produces in them a thickening, a shrinking, and an inactivity that reduces their usefulness. That they may work rapidly and equally the membranes require to be at all times properly charged with water. If into contact with them any agent is brought that deprives them of water then their work is interfered with; they cease to separate the salts correctly, and if the evil that is thus started be allowed to continue, they contract upon the substance they enclose, in whatever organ it may be situated, and render it condensed.

In persons who drink much gin the liver becomes hard, rough, and shrunken, so that these persons are said to have "hob-nailed," or gin-drinker's liver, from which they die. The change or disease which is brought about in them is of the kind explained above. It is due to the action of the alcohol on the fine membranous structure of the liver.

These serious bodily injuries from alcohol are spread through the whole class of mankind which indulges in strong drink. The class forms great and distinct populations who suffer under one condition or other of alcoholic disease brought about in this way.

In short, as there are four distinct stages indicating that strong drink has caused intoxication in an individual, so there are four distinct stages indicating its effects on the great populations which are habituated to its daily use. These populations are quite as distinct as the man is in the various stages leading to drunkenness and to death.

QUESTIONS.

- | | |
|---|---|
| 1. What injury does strong drink do to the heart? | 5. What is the action of strong drink on the blood? |
| 2. What is the general bad effect of excitement from strong drink? | 6. Describe what are called the membranes of the body, and the general uses of the membranes. |
| 3. What danger overbalances any possible good from the use of strong drink? | 7. What is the action of strong drink on the membranes? |
| 4. What false argument do feeble people sometimes use respecting the effects of strong drink? | 8. Name one particular well-known disease as specially connected with the action of strong drink. |

"I never suffer ardent spirits in my house, thinking them evil spirits. If the poor could see the white livers and shattered nervous systems which I have seen, as the consequence of drinking, they would be aware that spirits and poison mean the same thing."
—*Sir Astley Cooper.*

"Ardent spirits dispose to every form of acute disease. . . . I have known many persons destroyed by them who were never completely intoxicated in their lives."—*Dr. Benjamin Rush.*

"A jolly brave toper who could not forbear,
Though his life was in danger, old port and strong beer,
Gave the doctors a hearing, but still would drink on,
Till dropsy had swelled him as big as a tun;
The more he took physic the worse still he grew,
And tapping was now the last thing he could do.
Affairs at this crisis, and doctors come down,
He began to consider—so sent for his son.
Tom! see by what courses I've shortened my life,
I'm leaving the world e'er I'm forty and five;
More than probable 'tis, that in twenty-four hours
This manor, this house, and estate will be yours;
My early excesses may teach you this truth,
That 'tis working for death to drink hard in one's youth.
Says Tom (who's a lad of a generous spirit,
And not like young rakes who're in haste to inherit),
Sir, don't be dishearten'd; altho' it be true,
Th' operation is painful and hazardous too,
'Tis no more than what many a man has gone through.
And then, as for years, you may yet be call'd young,
Your life after this may be happy and long.
Don't flatter me, Tom, was the father's reply,
With a jest in his mouth, and a tear in his eye:
Too well by experience, my vessels, thou know'st.
No sooner are tapp'd, but they give up the ghost."

—*Taylor.*

III.—ALCOHOLIC POPULATIONS.

Af-fin'i-ty , connection; attraction of combination.	Gross , large, coarse, bulky.
A-po-lo-gy , something said or written to excuse or explain.	Im-bib'ed , absorbed, swallowed.
Cess-a'tion , ceasing or suspension of any action or motion, discontinuance.	Ir-rev'o-ca-ble , beyond recall.
Clamm'y , moist, sticky.	Mer'ged , swallowed up.
Cu-ta-ne-ous , relating to the skin.	Neu-ral'gi-a , severe pain in a nerve.
Con-trit'ion , deep sorrow for sin; repentance.	Phe-nom'en-a , appearances, signs.
De-te'ri-o-rate , to grow worse; to be impaired in quality.	Pleth-or'ic , too full of blood.
E-lim'in-ate , to throw off.	Pro-noun'ced , decided, affirmed.
Ex-ag-ger-a'ting , enlarging beyond truth.	Rheu-mat'ic , relating to the disease rheumatism.
Fill'ip , a quick stimulation; a jerk.	Tol'er-ance , power of enduring.
	Typ'ic-al , after a given form or type.
	Vas'cu-lar , pertaining to the vessels of the body.
	Vi-bra'tions , waves, as of sound; alternate motion.

FIRST AND SECOND ALCOHOLIC POPULATIONS.

WE have become acquainted with the general fact that in the world at large there are four great populations, the members of which, in a more or less permanent way, are in one or other stage of disease from strong drink.

The simplest form of disease from strong drink is seen in those who have become habituated to the frequent use of alcohol up to the first degree of its action, when it is producing the flush and warmth which has been already described. Persons who are habituated to alcohol to this extent find in the agent, what seems to them to be, a daily necessity. They rise in the morning imperfectly refreshed by sleep, and they derive from the first meal of the day, the ordinary breakfast, a very imperfect sustinment. As the day advances some want is felt, generally, the stomach seems to require a fillip, the nervous system is languid, the mind is dull, and the muscles are easily wearied. There is, in addition, a sense of central feebleness as though the heart were waiting for an expected and necessary support.

Under the apparent necessity created by these desires some alcohol is imbibed, and relief seems for a time to be obtained.

The relief is speedily got, and the power for work or for play is restored; but the effect is of short duration. After a brief period the drink is demanded again, either with or without food, and at each meal it is felt to be as essential as the food itself. Nay, it is often felt to be so essential that food is as nothing without it. Thus the desire for it is day by day sustained; the heart cannot perform its work when, from the removal of the alcohol, the power of the minute arterial vessels once more becomes natural, and complete disorder is established in the functions by which life is manifested and upheld. I am not exaggerating when I say there are hundreds of thousands of persons who are systematically passing through their lives in this state of unnatural existence.

Presuming that under these conditions no further excess of alcohol is received by the body, and that the second degree of alcoholic excitement is rarely, if ever, reached, the effects induced are varied by the peculiarities of the individual. In certain instances the power of the individual to throw off the poison is active, and he is able to get rid of it with such readiness that the injurious action it would otherwise speedily excite, is long delayed. In such instances we say that the person exhibits a tolerance for the alcohol; and now and then this tolerance is so effective, that until the close of a long life it prevents the outbreak of fatal disease. But these examples, when they happen, are very marked exceptions to a general rule.

As a general rule the effect of the continued use of alcohol carried frequently to the first degree is to create a series of functional and afterwards of organic changes,

which end in the establishment of distinct and irrevocable disease.

While the body is in its early stages of growth and development, that is to say, up to the twentieth year, the influence of the depressing agent is mainly on the functional activity. When the growth is perfected, and the organs are settling down to their fixed and steady work, without further chance of increase of size or of functional power, then the organic changes commence, and, however slowly, continue in progressive course.

After a time the affected person, in this first stage, becomes what is called dyspeptic. He suffers from indigestion. His sleep also is bad; sometimes he is very sleepy in the day time when he ought to be awake, and sometimes he is awake in the night when he ought to be asleep. Any little annoyance or worry keeps him agitated and restless, and he is easily flushed and flurried. He is disturbed in his sense of hearing; he hears buzzing sounds, or dull noises in his head, and often feels short starts and jumps at the same time, which indicate that his nervous system is much deranged.

I repeat there are hundreds of thousands of persons who are suffering these discomforts from wine and beer and other kinds of strong drinks without being for a moment conscious of the cause. They get, I am sorry to say, so to like and enjoy the cause, that they shut their eyes to its evil influence, and attribute their unpleasant feelings to any and everything except that one thing.

These are, briefly told, the signs of the effects of strong drink in the habitual first stage of its action.

In the second stage the evils are much more advanced and pronounced. The external surface of the body, during this second stage of alcoholic disease, is easily affected and

disordered. The vessels of the skin are markedly relaxed when the influence of the alcohol is re-excited by a renewed dose. The face and ears redden, and the whole of the surface of the skin seems in a glow. At first the vessels regain their size when the alcohol ceases to exert an influence on them ; but by-and-bye, under the frequent repetition of the relaxation, the vessels begin to retain the unnatural change to which they have been subjected, and in the extreme parts, such as the cheek and the nose, they assume a distinctive appearance of confirmed redness. For the same reason, the cutaneous secretion is irregular ; a small amount of exertion creates a too free perspiration ; and a little excess of covering to the body has the same effect. The perspiration is profuse, and, condensing quickly on the skin, as water, instead of going off in vapour with a warm glow, is clammy, heavy, and most oppressive. At intervals the secretion of the skin is extremely acid.

At the same time, all the other signs of disturbance, especially those of indigestion, noticed in the first stage, are much more decided and disagreeable, while to them there is added one which is never altogether absent, I mean an undue thirst. The real amount of liquid required per day by man, under ordinary circumstances, does not exceed one to two pints, because every portion of what seems to be solid food supplies water. But when alcohol is introduced the natural demand for drink is increased at every turn. The alcohol, while in the tissues, itself demands water, owing to its great affinity for that fluid, and, to gratify this demand, the simple necessary one or two pints is increased at different meals and between meals, to many pints a day. Thus, I have known a so-called temperate man take a pint of tea or coffee at breakfast ; a pint of ale between breakfast and luncheon ; a couple of glasses of sherry, with half

a pint of water at luncheon; an intermediate glass of ale or cup of tea between luncheon and dinner; two pints of mixed drinks, in form of ale, wine, or water, at dinner; and a final draught of spirit and water, or wine and water, or seltzer water, amounting to yet another half pint of fluid before going to bed.

In this instance the body has been receiving fluids to the extent of at least six pints per day, or two or three times beyond what is really required. Naturally, a body thus treated deteriorates; it becomes gross from the quantity of unused water laid up in its tissues; its secreting organs become overtaxed; its stomach becomes distended with fluids and gases; its muscles are relaxed; its heart and its muscles of respiration are enfeebled. Most naturally, its nervous system fails in activity and power.

In men who in the course of one day drink enormous quantities of beer, draymen for instance, this condition is very distinctly seen. They may consider themselves to be very temperate persons, yet all the while they are suffering a deterioration which they do not recognise, but which is always present in some degree, and is felt as years advance. They detect too acutely changes of season. The summer is more than genial, it is life-giving; the autumn is dreary; the winter depressing; the first months of spring, with their keen easterly winds, are almost destructive. Neuralgic, rheumatic, or gouty pains, varied according to the constitution, tease or torment; and, at last, long before the natural period for cessation from active work has arrived old age has set in. The weakened vessels are ready to give way under slight pressure, and life is ready to depart under natural shocks, which to a man of healthy structure would be but as passing vibrations easily resisted by the force within the body.

If a man commenced his alcoholic life at his twenty-first year, and lived under it to his sixtieth, his heart during that time would have performed an excess of work from an unnecessary cause equal, at least, in value to the natural term of three years' work, to say nothing of the change of physical structure it would have undergone from the perverted nutrition to which it had been subjected. Those who suffer, as above described, form a large population of so-called temperate persons.

THIRD AND FOURTH ALCOHOLIC POPULATIONS.

The third population, also large sufferers from strong drink, comes next before us. In this, owing to the greater excess in which the members of it indulge, the organic mischiefs are much more intensified and special. In persons of this class the alcohol has produced true disease, the effect of which is shown in the failure of some important organ, such as the heart, the lung, the liver, the brain.

The victims of this type of alcoholic disease are truly intemperate, but they are not of necessity drunkards in the usual sense of that term. They may be so, and they often are, but they need never have been intoxicated to insensibility in the whole course of their lives. Some of them are called simply "hard drinkers," others "sots," and others "drunkards." They all partake freely of strong drink at every available time and season. Ordinarily they cannot live in comfort without a certain daily excess of alcohol, which excess must needs be increased, if there be stress of work to perform, a reduction of the hours of sleep, or an addition of what is called "life." As a general fact, the appearance which these persons present is typical of their condition. They are relaxed in muscle, they are plethoric, and their faces

are often a ruddy-purple which deepens as the day advances and very readily darkens when the air is cold. Physically, these persons are weak; mentally, they are undecided and cowardly. They are irritable at all times. Some of them suffer paroxysms of rage and storm, which subside into contrition, apology, and shame.

In this stage of alcoholic disease the evidences of impaired health are obvious even to the common observer. To the physician the impairment is told, with precision, by many definite signs. There are the signs of which the wisest of men spoke; the story of wounds without cause; the contention, the woe, the sorrow; the redness of the eyes. There is, moreover, the tremulous muscle, the soft feeble pulse, the cold clammy skin, the white coated tongue, the injected husky throat, the labouring or irregular breathing, the feeble heart. Not unfrequently these symptoms are all present in the same person, or some of them are present at one period and some at another. An alcoholic constitution of body is, in fact, established, upon which all kinds of diseases are engrafted with facility.

I am obliged to add to these facts the further fact that there is a fourth population resembling persons who are actually drunk. These persons are bereft of their voluntary powers, and of many that are involuntary. They cannot walk; they cannot help themselves to food; they cannot speak intelligently; and, indeed, to them life is a blank. We find such persons among the richer classes at their own homes, a burthen to themselves, and to all about them. We find such among the poorer classes, as inmates of the asylums for the insane, where they are often classed as sufferers from "general palsy" or "general paralysis." Only a little step separates such sufferers from the grave. They live, in short, as the man dead drunk lives, because

the breathing remains to fan the blood into life, and the heart remains to send the blood round the powerless body. All else is palsied and practically dead.

You who are young and strong, bearing these pictures of the four great populations from strong drink in your minds, have two vital truths to keep in memory. The first is, that each of these stages is a step onwards and onwards, from what was originally a position of perfect security. The second is, that the moment a person leaves the position of perfect security, he is in danger of making all the false steps onwards and onwards, and, as a stone coming to the earth comes more quickly as it approaches the earth, so each of these steps is more rapidly reached as the one leaves the other behind.

QUESTIONS.

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|--|---|
| 1. What are the general effects of strong drink on those who are in the habitual first stage of its action?
2. What are the effects on those in the habitual second stage?
3. What are the effects on those in the habitual third stage?
4. What are the effects on those in the habitual fourth stage? | 5. What is the quantity of fluid that is daily required by a man in health?
6. When this quantity is greatly exceeded what are the bad results?
7. What does alcohol do in regard to thirst?
8. What is the first practical lesson from the facts stated?
9. What is the second practical lesson from them? |
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“For 'tis not only individual minds
 That habit tinctures, or that interest blinds.
 Whole nations fool'd by falsehood, fear, or pride,
 Their ostrieh heads in self-illusion hide.”—*Thomas Moore*.

“Let no one say when he thinks of the drunkard, broken in health and spoiled of intellect, ‘I can never so fall.’ He thought as little of falling in his earlier years. The promise of his youth was as bright as yours; and even after he began his downward course he was as unsuspecting as the firmest around him, and would have repelled as indignantly the admonition to beware of intemperance. The danger of this vice lies in its almost imperceptible approach. Few who perish by it know its first accessses. Youth does not see or suspect drunkenness in the sparkling beverage.”—*Dr. Channing*.

Iago. What, are you hurt, lieutenant?

Cassio. Ay, past all surgery.

Iago. Marry, heaven forbid.

Cas. Reputation, reputation, reputation! O, I have lost my reputation! I have lost the immortal part of myself, and what remains is bestial. My reputation, Iago, my reputation.

Iago. As I am an honest man I had thought you had received some bodily wound; there is more sense in that than in reputation. Reputation is an idle and most false imposition, oft got without merit, and lost without deserving. You have lost no reputation at all, unless you report yourself such a loser. What, man! there are ways to recover the general again. You are but now cast in his mood, a punishment more in policy than in malice; even so as one would beat his offenceless dog to affright an imperious lion; sue to him again, and he is yours.

Cas. I will rather sue to be despised, than to deceive so good a commander with so slight, so drunken, and so indiscreet an officer. Drunk? and speak parrot? and squabble? swagger? swear? and discourse fustian with one's own shadow?—O thou invisible spirit of wine, if thou hast no name to be known by, let us call thee devil!

Iago. What was he that you followed with your sword? What had he done to you?

Cas. I know not.

Iago. Is't possible?

Cas. I remember a mass of things, but nothing distinctly; a quarrel, but nothing wherefore.—O that men should put an enemy in their mouths to steal away their brains! that we should, with joy, pleasance, revel, and applause, transform ourselves into beasts!

Iago. Why, but you are now well enough; how came you thus recovered?

Cas. It hath pleased the devil drunkenness, to give place to the devil wrath: one unperfectness shows me another, to make me frankly despise myself.

Iago. Come, you are too severe a moralist: as the time, the place, and the condition of this country stands, I could heartily wish this had not befallen; but since it is as it is, mend it for your own good.

Cas. I will ask him for my place again; he shall tell me I am a drunkard! Had I as many mouths as Hydra such an answer would stop them all. To be now a sensible man, by and by a fool, and presently a beast! O strange. Every inordinate cup is unblest'd, and the ingredient is a devil.—*Shakespeare.*

IV.—FALSE ARGUMENTS REFUTED.

Ac-cred'it-ed , authorised; publicly accepted.	In'fer-ences , deductions or conclusions.
As-pire' , to rise; to desire.	Op-po'nent , one who opposes.
Cham'pi-on , a defender; a hero; a successful competitor.	Pre-cis'ion , exactness, accuracy.
Com-pe-ti'tion , a contest; a strife.	Qual-i-fi-ca'tion , fitness for duty or action.
De-cis'ion , final judgment; firmness and readiness in determining what to do.	Re-cruit'ed , repaired, replenished.
En-dur'a-ble , capable of being borne or suffered.	Ri'val , one who competes with another.
Ep'i-sode , an incidental narrative.	Spurts , rushes or starts; sudden efforts.
Fac'tor , an agent; an active instrument or part.	Suf-fu'sed , overspread as with a colour.
Gra'zier , one who pastures and rears cattle.	War'rant-ed , authorised, justified.

As you go on in your lives, you will find many who belong to the great alcoholic populations trying to persuade you to join them in their mad career. They will declare you ought to join them, and they will assign various reasons why you should. Two of these reasons will be strongly urged. They are. (1.) That total abstainers from strong drink are pale-faced. (2.) That total abstainers are feeble and inactive. Let us see how far these statements are true.

RED AND PALE FACES.

Those who laugh at abstainers from alcohol for being pale-faced, would be warranted in laughing if it were the fact that the red face, they so much admire, is indicative of health, and that the pale face is indicative of disease. Unfortunately for their side of the case, that suffused red face, that jolly red face, that dark red face, is the face of disease, while the pale face is as nature meant it to be. Unfortunate, also, for the laughers is the fact, that the red and suffused and dark face of the alcoholic drinker is not simply skin deep and confined to the face. The same redness extends to more vital surfaces. The surfaces

of the brain and of other vital organs are suffused in like manner, according to the degree of injury that has been inflicted on the blood-vessels by the paralysing drink that is often falsely accredited with so much usefulness.

There is, as I have before related, an immense population living from day to day in a half palsied condition of the circulation. The members of it, in the midst of their laughter at the abstainers, are half-wrecked. They are like the Red Indians, who look with contempt on the pale faces, while unconscious that their own power is as rapidly fading as the power of those they contemn is being preserved.

In course of time the members of this red-faced alcoholic population, easily overbalanced by slight causes, almost inevitably fall into death prematurely, if they continue in their course. Sometimes they fall from failure of the heart. Sometimes under a little extra excitement a vessel gives way in the brain, and they become partially paralysed, if they do not die immediately. Sometimes they get liver disease, sometimes consumption of the lung. Sometimes they sink under that general palsy which is known as general paralysis.

Physically, the condition of the whole of the members of this great population is very bad. They are the last who should make sport of the pale faces. The physician who, at the examining board of the life assurance company, has learned the necessity of casting up the value of life, as he would a column of figures in simple addition, knows them all very well. He ticks off so many years from their lives, according to the stage of alcoholic disease at which they have arrived, almost with as much precision as an engineer driving a steam-engine reduces the pressure of his steam from the reading of the pressure-gauge. The

physician may not himself be a total abstainer. He may dine in the evening with the man whose life he has ticked off in the afternoon, and over the wine he may laugh with his friend at the pale-faced wretches who declare that every round of the deadly working decanter is another addition to the ticking off. But he knows, as well as I do, why he had to reduce the value of the life before him; and if he would reflect he would feel as I do, that the passing of the decanter was the fatal factor in his painful but necessary professional calculation.

Do not, then, be afraid of having a pale face, if it be a healthy and honest one. Do not believe that all who abstain from strong drinks have pale faces, for that itself is not true. Above all, do not aspire to get the red face from drink, for if you do you will share the drinker's fate, and that is not desirable in any way.

ABSTINENCE AND ACTIVITY.

Those who say that abstainers from alcohol are feeble, and want skill and capacity for work, mistake seriously the facts. The very best workers of all kinds, the best runners, the best walkers, the best rowers, the best swimmers, the best soldiers, the best sailors, the best writers, the best speakers, the best labourers, the best artisans, the best of all classes of occupations, have been found in the ranks of those who do not touch strong drink.

Let me tell you an anecdote in proof of this, which occurred very early in my own career, and which I candidly confess ought to have made me an advocate of temperance over thirty years ago. I lived then on the Thames, at Mortlake, Surrey, between which place and Putney the great boat races are held, and it happened to me once to know one of the chief trainers or oarsmen. He was a

champion upon the Thames, and had won a large number of races. He was a little unwell, and one day when I thought he looked weak and ailing, I said to him, "You ought to take a little wine or beer." "I cannot do that," he replied, "it would not suit my business." I asked him why? And he said, "Well, I am not a teetotaler, as they call it; but I know, as a matter of practical experience, that I must keep away from strong drink." I felt interested in what he said, and asked him upon what his rule to this effect was based?

"In my profession," he answered, "I require to know precisely what I am about, so as to act properly at a moment's notice; never to be put out by noise, or cheering, or shouting, or finding fault; and always to hold on to the last." "That," I replied, "means precision, decision, presence of mind, and endurance." "True," he said, "that is just it, and these qualities are essential to the successful performance of my work. All my successes turn upon them, and I get all of them if I abstain, while I lose them if I take ever so little strong drink, for mine is a very ticklish part to play, I assure you." And then he told me this little episode about himself and another great rower:

"Once I was going to win a race, as I hoped. I had a strong competitor who was quite equal to myself. I had watched him rowing before, and the precision of his stroke and the character of his work, showed me, clearly, that he was a formidable rival. I knew I should have a tough job to beat him. Well, on the occasion of the race I refer to, we started to his advantage on two points. He had won the toss for side of the river, and that was a little against me, and the sun was more direct in my face than in his. But just as he was getting into his boat, I noticed

one of his supporters give him a glass of whisky. I said to myself, 'that's worth, to me, the lost side of the river.' 'Wet the other eye, old fellow,' said another supporter, as he gave him a second little glass of the whisky.' 'That,' thought I to myself, 'is worth the sun to me, for now I shall win.' We were ready to start, the steamers got behind us and went apart, and we were off. We both pulled so regularly, and with such perfect precision, that there was nothing to be heard but one gentle stroke of our oars on the water: We were pulling for a long time, and I thought at last that I might not possibly win the race after all, when, as we were still side by side, I heard the smallest, faintest possible tinkle, for I could call it nothing else, in one of his strokes. His oar in going down had struck the water out of time. It was a very slight slip, but my ear caught it, and I knew he was losing his stroke.

"A little further on, as we were getting nearly opposite Chiswick, something like a boat turned upside down was floating before us. I was collected, and knew what course to take without a moment of hesitation. My opponent did not know. He hesitated, and waited to see what I did, by which he lost both in time and self-confidence, so that now I got a little ahead of him. Next minute I observed that he began to be affected by the noise from the people on the steamers and on the shore. He looked round at them, and made what one calls spurts in response to their noise, and this interfered with his own judgment. At last, while I was still quite fresh, he began to get tired and to pull irregularly and more feebly than at first. Of course the race, sir, was now mine. I was quite master of the situation. I could have won by several boat's lengths; but he was a good chap, and I had taught him to row, so I let him come in as close as I dare, and though he lost he

made a very creditable appearance, and he wasn't ashamed of having been beaten by an old stager like me."

Let me give one or two further practical examples. In the days before there were any railways people used to travel by the old "stage-coaches," coaches drawn by four horses, at the rate of ten miles an hour, in stages, at which the horses were regularly changed. I just recollect these coaches myself, although I do not think I ever rode in one. I only remember seeing them dash along the roads, and how I often wished I could rattle away with them. I did not know then what hard and tiring work it was to travel by the coach; but in talking to those who have travelled much by it, I have learned that some were good and some were bad travellers, and that they were always the best who took no wine and no strong drink by the way. Evidence of a similar kind has been left in the writings of the late Dr. Cheyne, of Dublin, who says that nervous people who think that when strength is exhausted it may be best recruited by wine, are under a strong delusion. He tells us that he was first led to suspect this by the result of a long journey which he once made in the mail coach, while in a state of great anxiety. He travelled nearly seven hundred miles almost without stopping, having been five nights out of six in the coach, during which time he could not have slept half as much as usual, and the sleep he obtained was unsound and interrupted. During the whole time he lived chiefly on bread and tea, with a small portion of animal food once a day. He drank no malt liquor, wine, nor spirits. At the end of his expedition he was scarcely more exhausted than when he set out. During the journey he had several opportunities of seeing persons, who regaled themselves two or three times a day, who guzzled as much as the time would

permit them to do, while the carriage halted, and who were completely worn out by journeying for one or two nights.

The same eminent author records another equally useful narrative. He states that in the county of Galway two extensive graziers met at dinner, when, upon a discussion taking place between them respecting the best method of enabling their herdsmen to endure the cold watching and fatigue to which they were exposed in driving cattle to Ballinasloe, it was resolved upon by one of the graziers that he would supply his herdsmen with abundance of good and wholesome food, but give them only water to drink, while the other determined that he would give his men an abundant supply of whisky. Accordingly, the two sets of herdsmen started at the same time to the October fair at Ballinasloe.

They were all able-bodied young men of similar habits; the journey which they had to perform was of the same length, the fatigue the same. The weather was wet and inclement, and they, all drenched with wet, were obliged to sit up during the night in their soaked garments. On carefully contrasting the water-drinkers with the whisky-drinkers, the result was decidedly in favour of the water-drinkers who were in full vigour, had never quitted their posts and bore up well to the last; while the others were so completely exhausted that, during part of the time at the fair, they were useless, and on their return home were scarcely able to drag one leg after the other.

These are good lessons to keep in mind, but they really are only a very few out of a great number which I could place before you. Recently a gentleman has taken the trouble to collect a number of examples of precision, decision,

endurance, and presence of mind amongst total abstainers from alcoholic drinks. He shows us that the majority of Queen's Prize winners at Wimbledon, most of the leading oarsmen, including Trickett and Hanlan, and the crack Yankee shots, Partello and Carver, consider the less stimulants and narcotics a human being indulges in the better.

Mr. Rae, Queen's Prize winner in 1878, confesses that he indulges in two ounces of tobacco per week, and a "glass sometimes." But he has the courage to maintain that both forms of indulgence are bad, and that he would be much better if he gave them up entirely. Mr. Partello, the wonderful American marksman, who lately made two hundred and twenty-four points out of two hundred and twenty-five at long ranges, has always been a total abstainer, and has now given up tobacco. Sergeant Okey, the champion shot of New Zealand, lately attributed his success to his having been a teetotaler all his life, and not a smoker. Trickett and Hanlan are quite of one mind about the injury inflicted on the physical powers by the use of narcotics and stimulants. Weston, the great walker, is an earnest abstainer, and all the leading tri-cyclists and bicyclists declare in favour of abstinence. Messrs. T. R. Marriott and A. F. Bird recently cycled from Derby to Holyhead, a distance of 180 miles, in less than twenty-four hours. They touched nothing alcoholic, and declare they could not have accomplished so remarkable a feat if they had done otherwise.

As you close this Lesson, you may be sure that abstainers, even when they are pale-faced, may be quite healthy; that the bloom from alcohol is more dangerous than the paleness from water; and that strength, activity, precision, decision, endurance, and presence of mind, are qualities of mind and body specially supported by total abstinence.

QUESTIONS.

1. What two charges are often brought against those who habitually abstain from strong drinks?
2. Are the pale faces of those who abstain, or the red faces of those who take strong drink, the most healthy?
3. What are the dangers indicated by the red or suffused face caused by alcohol?
4. What are the proofs that those who abstain from alcohol are good and effective workers?
5. Give an illustration, from the narrative of a champion oarsman, of the value of total abstinence from strong drink.
6. What four important qualities of mind and body did this oarsman exhibit under abstinence from strong drink?
7. How did they contribute to his success?
8. What evidence of endurance under abstinence from strong drink does Dr. Cheyne record in respect to himself?
9. What other evidence of a similar kind does he supply?
10. What later evidences of a similar kind can you adduce?
11. What inferences do you draw from these experiences?

“ Oh, Hector, say what great occasion calls
My son from fight, when Greece surrounds our walls?
Stay till I bring the cup which Bacchus crowned
In Jove's high name to sparkle on the ground,
And pay due vows to all the gods around.
Then with a plenteous draught refresh thy soul,
And draw new spirits from the generous bowl.
Far hence be Bacchus' gifts, the Chief rejoined,
Inflaming wine, pernicious to mankind,
Unnerves the limbs and dulls the noble mind.”

—*Pope's Homer.*

“ Although life's index points to sixty-two I am a stranger to all sexagenarian disabilities, and can mount to the top of a tree with my wonted steadiness and pleasure. As I am confident that I owe this vigorous state of frame to a total abstinence from all strong liquors, I would fain say a parting word or two to my young reader on this important subject. If he is determined to walk through life's chequered path with ease to himself, and with satisfaction to those who take an interest in his welfare, he will have every chance in his favour, provided he makes a firm resolution never to run the risk of losing his reason through an act of intemperance, for the preservation of his reason will always ensure to him the fulfilment of his resolution, and his resolution will seldom fail to crown his efforts with success. The position of an irrational ass, cropping thistles on the village common, is infinitely more tenable than that of a rational man under the influence of excessive drinking. Instinct teaches the first to avoid the place of danger, whilst intemperance drives the last headlong into the midst of it.”

—*Charles Waterton.*

V.—HAPPINESS WITHOUT STRONG DRINK.

Ad-dict'ed , given up to a thing or pursuit.	Hos-pit-al'i-ty , kindness to guests.
Ad'vo-cate , a pleader.	In'di-ces , guides.
A-gra'ri-an , relating to lands.	In-sa'ti-a-ble , incapable of being satisfied.
A'-li-en , a foreigner.	Out'rage , violence; wanton mischief.
Com-mu'ni-ties , persons living together, as in a town.	Po-lit'i-cal , pertaining to policy or rule.
En-ter-tain' , to receive hospitably.	Rec're-a-tive , pleasurable.
Fac'to-ry , a place where persons work together.	Seed'y , sickly, miserable-looking.
Har'mo-ny , musical concord.	Vi'nous , relating to wine and other drinks containing spirit of wine or alcohol.
Host , one who receives and entertains guests.	
Host'ess , a lady entertainer.	

THERE are people who, themselves addicted to what they are pleased to style the pleasures of the cup, will try to persuade you to join them in it for what they call the fun and jollity of the thing. The great Sir Walter Raleigh used to speak of wine in this sense, and to commend it. It ought never to be taken when a person was doing serious work, but it should be taken on "recreative occasions." The ancients had this same idea when they advised that wine should only be taken at the feast, and I know many in these days who are of a similar opinion. They will not take wine or other strong drink when they are busy, but they will take it when they are out to "enjoy themselves."

It is all very well to talk in this manner, but between talking and doing there is the widest difference. "Those who indulge at the feast soon give up the fast," says the old proverb, and so it is. Those who make alcohol a pleasure soon find they are on a see-saw.

"Now they go up, up, up,
Now they go down, down, down."

And, as when they are down they want to get up again, they try alcohol in order to get up, and are into the full use and abuse of it before they know what they are about.

Whenever I hear a man talking in this way about strong drink, I am quite sure that, in nine cases out of ten, he is merely excusing himself for the employment, or, as he would say, the enjoyment of it both at the feast and the fast. As to merriment and fun, that really is just as good without strong drink as with it; and as mirth without it leaves no sting behind, the enjoyment, in the long run, is as much the purest as it is the safest. Those who abstain, know pleasures which others do not know. All the beauties of nature are felt by the abstainer in a more refined, and deeper, and purer sense. There is no after dark cloud, no feeling of regret at some slight, check, or annoyance, no spell of langour from excitement and worry.

I have had two or three times in my life to go amongst working people for scientific purposes, to ascertain the diseases from which they suffer owing to exposure to influences connected with their occupations. I have had to inquire into the facts of occupations as regards the surrounding circumstances, and having thus had many opportunities of observing the working of the temperance reformation among the various classes of my countrymen, I have seen an increase of happiness wherever the temperance reformation has made its way. Let me give you two illustrations.

Long before I was an advocate of temperance, I was led one day, by a friend who had a number of men in his employ, to the door of a large factory. He said, "listen to that." I had passed in as a stranger; he had not been aware of my coming, and nothing had been provided or arranged beforehand, and so I listened, and I heard men singing something exceedingly sweet and harmonious. I never heard in all my life before a number of men at work singing in such harmony. My friend, turning to me, observed, "you

hear what you would not have heard five years ago. You would then have heard the most common language and observation; one man telling another to 'shut up;' or one quarrelling with another about some misplaced tool. Now you hear the harmony which prevails!" "Upon what does it depend," I asked. He replied, "upon something which one day you will have to consider. These men, through the influence of one of their own number, have been brought over to total abstinence from strong drinks." The fact struck me as being very remarkable, and influenced my mind greatly at the time.

A few years ago I was travelling through Ireland to give a course of lectures. I came to the town of Newry and lectured there. Newry is a large town with many public houses and a great deal of distress and disease in it. I went on a little way from Newry, and came to the town of Bessbrook, which contains a population of some 4000 inhabitants, and which belongs to Mr. John Grubb Richardson. In the year 1845, that gentleman determined that into the town of Bessbrook not one drop of whisky or other form of spirituous drink should enter. It was all under his own control; he was, truly, "monarch of all he surveyed;" and, by strictly carrying out total abstinence in his own particular person and in that place, he made that place a temperance town.

We hear about the Irish character and its characteristics; about agrarian outrages; about people being shot at from behind hedges; about crime and quarrelling, and Donnybrook Fair. But I think we shall have occasion for agreeable surprise when we know the facts as far as they relate to this town of Bessbrook, which has a mixed population, consisting of Irishmen and Scotchmen, people from the north of Ireland of Scotch extraction, and a few Eng-

lishmen, professing a mixture of religions ; Roman Catholics, Presbyterians, Quakers, and other sects ; in fact, many races and many classes of opinion.

I inquired what the effects of total abstinence are in this village. The first effect was this, that for fifteen years they had never had a policeman in that place. At one time, when a political rising was talked of, Government insisted upon sending a policeman there simply to observe ; but he was obliged to appear in the place in disguise, as he would not have been tolerated had his actual business been known. There had been no rioting, or, at all events, so little rioting or quarrelling that the magistrates never had more than five or six people brought before them in the course of the year, and those who had come before them were invariably brought by some political movement. Such is the immunity from harm which these people enjoy, that it amounts practically to the removal of what we call crime.

Every man had a garden, tastefully laid out, and the cottages were neatly furnished with all possible comforts. There was a nice reading-room, a large square, a playground, and, in fact, such accommodation that no man, who was not injured by luxury, need fail to reside there in comfort. I made another observation. Being a physician I was anxious to inquire into the diseases of the place, and I found during the whole day which I spent there, passing from house to house, that there was not one sick person in the entire town, and that no doctor had been seen in it for three months. I found what I might almost designate a garden of beauty, reminding me of the following description of the total abstinence town of Johnsbury, in the United States, related by my late distinguished friend, W. Hepworth Dixon :—

"No bar, no dramshop, no saloon defiles the place. Intoxicating drinks are classed with poisons, such as laudanum and arsenic; but as poisons may be needed in a civilised country, under a scientific system of medicine, laudanum and arsenic are permitted to be sold in every civilised state. Such is here the case with brandy, beer, and wine. A public officer is appointed by a public vote. The town lays in a stock of brandy, beer, and wine, which is carefully registered in books, and kept under lock and key. These poisons are doled out, at the discretion of this officer, in small quantities, very much as deadly nightshade and nux vomica are doled out by a London druggist. 'Cannot you get a bottle of cognac for your private use?' I ask Colonel Fairbanks. 'I can send my order,' he replies, 'for a pint of cognac; it will be sent to me, of course, but my order for it will be filed, and the delivery entered on the public book for every one to see.' 'You find that system rather inquisitorial, do you not?' 'Well, no, it is intended for the common good, and every-one submits to what is for the good of all. We freely vote the law, and freely keep the law, but for myself the rule is a dead letter, since no intoxicating drink ever enters my house.'

"In going through the mills I notice the several classes of artizans. Five hundred men are toiling in the various rooms. The work is mostly hard; in some departments very hard. The heat is often great. From seven o'clock till twelve, from one o'clock till seven—ten hours each day—the men are at their posts. The range of heat and cold is trying, for the summer sun is fierce, the winter frost is keen. Your ordinary citizen cannot live through the summer heats without a trip to Lake Champlain and the Adirondack Mountains. Yet the men engaged in

these manufactories of scales are said to drink no beer, no whisky, and no gin. Drinking and smoking are not allowed on the premises. Such orders might be only meant for discipline, but I am told that these five hundred workmen really never taste a drop of beer or gin. Their drink is water, their delight is tea, yet every one assures me that they work well, enjoy good health, and live as long as persons of their class employed on farms. 'These men,' I ask, 'who rake the furnaces, who carry the burning metals, and who stand about the crucibles—can they go on all day without their beer?' 'They never taste a drop, and never ask to have a drop. There is a can of water near them; they like the taste of water better than the fumes of ale, and do their work more steadily without such fumes.'

"Should a tipsy stranger be taken in the street (as sometimes happens, though the case is very rare), he is seized like a stray donkey, run into a pound, and kept apart till he has slept away the fumes of his abominable dram. An officer then inquires where he got his drink. On telling, he is set free, and the person who sold the drink is arrested, tried, and punished for the man's offence. The vendor, not the buyer, is responsible for this breach of moral order. It is just the same, whether the person supplying the liquor sells it or gives it away; so that a man entertaining his friends at dinner has to stand before the magistrate and answer for the post-prandial conduct of his several guests. One can imagine how this rule is likely to promote good fellowship round the mahogany tree.

"The drawbacks may be taken off the sum of public benefits. What then remains?

"*The workman's paradise remains; a village which has all the aspect of a garden; a village in which many of the*

workmen are owners of real estate ; a villiage of nearly five thousand inhabitants, in which the moral order is even more conspicuous than the material prosperity ; a village in which every man accounts it his highest duty and his personal interest to observe the law. No authority is visible in St. Johnsbury. No policeman walks the streets. On ordinary days there is nothing for a policeman to do. Six constables are enrolled for duty, but the men are all at work at the seale manufactories, and only don their uniform on speial days, to make a little show."

To individual experience of the happiness which attends abstinence from strong drinks, we have then the experience of large communities, which is better evidence, because more eomprehensive in its chaeraeter. If you question persons older than yourselves who have learned entirely to abstain, or who, happier still, have never learned to taste strong drinks, they will, to the letter, confirm all that I have told you. If you question those who indulge in strong drinks, they too will mostly confirm what I have told you. They will admit that after the excitement from the wine or the spirit has passed away, they are often depressed and irritable and seedy ; that the sad hours are much longer than the merry ones, and that there is no abiding enjoyment in their pleasure.

You will, however, meet with those who will tell you that it is hard to resist the temptation of joining others in taking strong drink. When at table you are a visitor, and your host or hostess invites you to drink, what are you to do? Let me advise you on this matter, first, that it is not in the least uncivil to decline, and next, that it is much easier to give a full *No* than a half *Yes*. If you say respectfully and firmly to your entertainer, I am much obliged to you, but I never indulge in anything

stronger than pure water, he will respect your wishes, and your comrades will not only respect your conduct, but will most likely be influenced to follow your good example.

While in this way you will feel that you are setting what every one can but acknowledge is a good example, you may rest assured, at the same time, that you are saving yourself from the most imminent dangers which often follow the example of the opposite kind. You will, I mean, avoid the dangers that are ever connected with the rash experiment of indulging in strong drink. I have ventured to tell you what some of these dangers are, but let me, as I close the chapter, repeat the lesson from one of the greatest authorities in science the world has ever seen. In a letter which the illustrious Charles Darwin sent to me a few years ago, a letter which I prize as one of the choicest of my literary treasures, he wrote with his own hand the following passage:—"I have been brought to the conviction from the very large experience of my father and grandfather, which has extended over a century, that no cause has led to so much suffering and inherited ill-health as the consumption of alcohol."

QUESTIONS.

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| <ol style="list-style-type: none"> 1. What argument is sometimes used in favour of occasional indulgence in strong drink? 2. What great man used this argument? 3. Why is it false? 4. Describe two towns from which all strong drink is excluded, and state the results of the exclusion. 5. What do persons who indulge in strong drink often admit as to its after effects on them? | <ol style="list-style-type: none"> 6. What is the best mode for avoiding strong drink when it is pressed on you? 7. Why, in relation to others, should you avoid taking strong drink? 8. What will you yourself escape from by keeping to the example which you set to others? 9. What did the illustrious philosopher, Mr. Charles Darwin, write in respect to the effects following upon the consumption of alcohol? |
|---|--|

"Great legislator ! scarce so great as kind !
 If men are rational, and love delight,
 Thy gracious law but flatters human course ;
 In the transgression lies the penalty,
 And they the most indulged, who most obey."

—Young.

VI.—CONCLUSION.

Ab-stain'er, one who abstains from some particular thing, now commonly applied to those who abstain from alcohol.

Ap-pre'ci-ate, to value.

Ath'-lete, one taking part in feats of strength.

Chron'ic, slow, running a slow course.

Com-pe-ti'tion, a striving for the same object.

Gym'nast, one who takes part in exercises for strengthening the body.

Im-pair'ment, feebleness, failure of power.

In-san'i-ty, madness, unhealthiness of mind.

In-sen-si-bil'i-ty, unconsciousness, having no feeling or knowledge of existence.

Man'u-al, done with the hand.

Me-dic'in-al, belonging to substances used as medicines for the cure of disease.

Pe-des'tri-an, a trained walker, one who competes in walking.

Rep-re-sent'at-ive, one who represents another or others.

Rills, small streams or brooks.

Vol-un-tee'r, one who enters any service of his own free will.

And now before I cease to speak to you who have read these Lessons on drink and strong drink, let me leave with you one or two final passages which will be, as it were, indices to what has been told you before, and will enable you, quickly, to recall to your memories the essence of the facts and arguments we have studied together.

Remember.

Alcohol, in whatever form it comes before you, in beer, in wine, in spirits, is a chemical substance and distinct from a food. It is one of a large chemical family of many similar substances, and has only by accident got into use amongst the substances called foods. It is a stranger and an alien in the family of natural foods.

Alcohol not being a food, not being a drink, cannot build up the natural structures or parts of the body; cannot supply water for carrying the different kinds of food round the body, nor for carrying the used-up food out of the body; cannot supply warmth, because its actual effect is to lessen the animal warmth and put out the vital fire; cannot assuage thirst, but, on the contrary, increases thirst.

Remember.

Alcohol acts on the body of man, and, through the body, on the mind of man, in the same mode as many other chemical and medicinal substances do, namely, to produce a special and well-defined class or order of symptoms or phenomena, which run a fixed course and lead to a fixed end. This course is from one first stage, through two others, to a fourth stage of insensibility, and, possibly, to a fifth of death; but never at any stage does it contribute anything useful to the healthy person.

In like manner alcohol acts on men generally as on men individually, to cause a fixed and long course of changes. It makes four distinct populations who are suffering under different slow or chronic stages of its influence. This course is from one first stage through two others to a fourth of helplessness, or to a fifth of death.

Remember.

The intention of all natural food is to build up and sustain the body; to nourish it under waste; to warm it; to give it strength; and to preserve its life as long as possible.

Alcohol is not food; it does not build up; it does not sustain; it does not nourish; it does not warm; it does not give strength; it does not preserve but shortens life.

All the action of good food and drink is towards the maintenance of healthy life.

All the action of alcohol is towards interference with good health and towards the impairment of health.

Remember.

Nature gives us the foods we want ready for use. We need manufacture none, and among all her gifts of proper

food and drink there is not one that creates an exceptional and insatiable desire for itself.

Alcohol is not directly given to us. It has to be manufactured, and it creates an exceptional, unnatural, insatiable desire for itself. In these particulars it is excluded as a natural food or drink.

The alcohol of strong drink and of all chemical substances like to it, if indulged in by all classes of living beings, would lead to a new form of life and action. Men and women would become, generally, insane, and the lower animals would be so changed that none of them would be manageable, none eatable, none workable.

For the support of such a world there is no sufficient provision in the scheme of creation as it lies before us, and, as far as can be seen, there is no such intention or object of a natural kind, because the end of such living would be universal insanity and death.

Remember.

He is the most industrious who is most temperate. Industry tells us through her representatives of all classes, through those who pay for labour and those who labour for pay, that better results, happier results, chaster results, and richer results to all concerned, stand forth from temperance.

Those who are engaged in superintending great works of labour where manual power is most required, state that the greatest amount of work is obtained from those who perform their work taking drinks like tea and oatmeal water, without the smallest quantity of strong drink of any kind.

Those who practise in order to excel in games and exercises of skill tell the same story. You will not forget

the lesson which the great rower gave to me, and which I for so many years failed to appreciate. But he was only one of many. Other great rowers, like Hanlan, teach the same. Marksmen who win the Queen's and other prizes at the volunteer camps, and who compete in other public places, runners, riders, jockeys, golfers, pedestrians, athletes, gymnasts, billiard players, bicyclists, tricyclists, cricketers, and indeed, all who take part in similar exercises, bear testimony to the fact that they get on better and are more successful in their competitions when they avoid strong drink altogether. Many, if not all, will tell you that they are sure to lose if they break through this good rule ever so little.

Remember.

They who abstain from strong drinks of all kinds are not only amongst the most industrious and useful, but are also amongst the healthiest and the happiest of mankind.

That abstainers are singularly healthy is proved by the fact that when their lives are subjected to the great test of insurance, they exhibit a definite commercial value of life above what is shown even by persons who indulge in the so-called moderate use of alcohol. That those who do not abstain are, on the other hand, often singularly unhealthy is proved by the fact that those who indulge freely in alcohol are those who show the lowest value of life. Thus the proof rendered in favour of abstinence is of two kinds, each one sound and conclusive.

That abstainers are amongst the happiest of mankind is proved by the fact that they are amongst those who are least afflicted with crime and poverty; that they quarrel little, despair little, and, of all the members of the com-

munity, yield fewest inmates to the gaols, the hospitals, the workhouses, and the asylums for the insane.

Remember.

He is the only safe abstainer who learns to rely for his drink on the fluid which the great Chemist and Ruler of life and Framer of our bodies, minds, and souls has given us for our use; the fluid which the Father of life has physically constructed for us and for the whole of his living creation; the fluid which He in His infinite knowledge and wisdom has ordained as sufficient for our every required labour, our every wholesome pleasure, our every necessary want; the fluid which is distilled in the grand laboratory of nature, which rises into cloud and snow, which descends in rain and mountain torrent, runs in rills and streams, gathers in the earth, and is offered for nothing wherever it is found.

Remember.

This fluid is the one and only necessary drink for man and all that lives, and its name is—*water!*

QUESTIONS.

1. What do you remember respecting alcohol in its relation to foods?

2. What do you remember about alcohol in regard to the stages of its action upon man?

3. What do you remember in proof of the fact that alcohol is not a natural food?

4. What do you remember respecting the results that would ensue if all living beings indulged in the use of alcohol?

5. What do you remember in regard

to the experience of those persons who have observed the effects of alcohol on men engaged in hard work, in exercises, or in games of skill?

6. What do you remember in relation to the health and happiness of those who abstain from strong drinks?

7. What do you remember in relation to the one safe rule for the selection of natural drink, and what is the natural drink for man and everything that lives?

“O comfortable streams ! with eager lips,
And trembling hand, the languid thirsty quaff
New life in you : fresh vigour fills their veins.
No warmer cups the rural ages knew ;
None warmer sought the sires of human kind,

Happy in temperate peace!
 Long centuries they lived : their only fate
 Was ripe old age, and rather sleep than death.
 Oh ! could those worthies from the world of gods
 Return to visit their degen'rate sons,
 How would they scorn the joys of modern time,
 With all our art and toil improv'd by pain ! ”

—*Armstrong.*

“ Let sober draughts refresh, and wholesome fare
 Decaying nature's wasting strength repair,
 And sprightly exercise the duller spirits cheer.”

—*Pythagoras.*

“ There grows no wine
 By the haunted Rhine,
 By the Danube or Guadalquivir,
 Nor on island or cape
 That bears such a grape
 As grows by the Beautiful River.

Drugged is their juice,
 For foreign use,
 When shipped o'er the reeling Atlantic,
 To rack our brains
 With the fever pains,
 That have driven the Old World frantic.

To the sewers and sinks
 With all such drinks,
 And after them tumble the mixer,
 For a poison malign,
 Is such Borgia wine,
 Or at best, but a Devil's Elixir.”

—*Longfellow.*





(52)

